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STEEL

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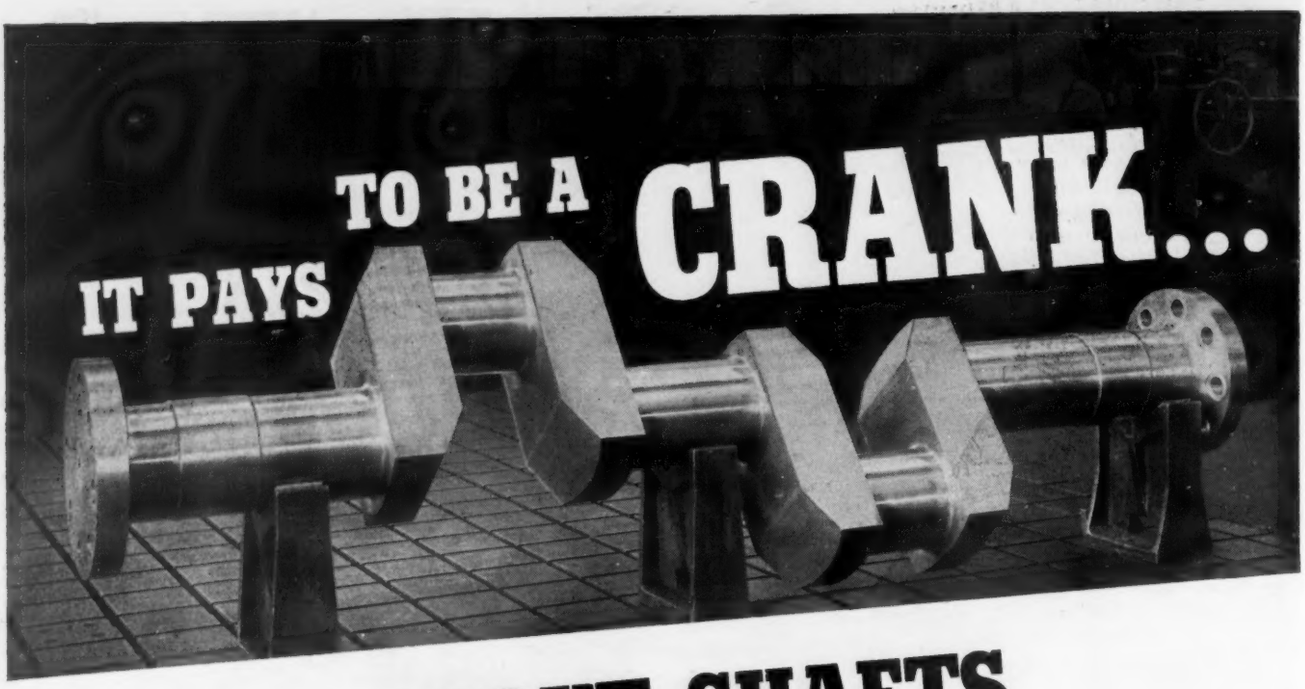


...ABOUT SHAFTS

WHEN ordering big crank shafts, it pays to be a crank—and insist upon alloys containing Nickel. Heavy duty marine forgings need Nickel. Spinning smoothly, they daily demonstrate how Nickel enables steels to resist gruelling stresses and twisting strains. Year after year of uninterrupted service testifies that Nickel greatly increases the mechanical properties of fine forgings. For safe, economical service specify steels strengthened and toughened with Nickel.

• • •

Erie Forge Co., Erie Pa., forged six 3½% Nickel steel crankshafts (one pictured above) for Staten Island ferry service. Each shaft is 13' long, weighs 9,000 lbs. Average of 10 tests showed tensile strength of 109,000 p.s.i., a yield point of 84,700, 22% elongation, 51% reduction of area.

NICKEL ALLOY STEELS

Goodman Mfg. Co., (Industrial Mfg. Div.) Chicago, furnished this main drive shaft for U. S. Army Engineers' towboat "Governeur." 3½% Nickel steel, SAE 2335, was specified.

THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL STREET, NEW YORK, N. Y.

As the Editor Views the News

■ THE holiday caused steel production last week to move down 12 points (p. 27) to 42 per cent of ingot capacity. Most of this loss (p. 81) will be retrieved this week. The construction field continues the leading steel outlet; miscellaneous steel users are contributing a large share of current demand. Farm equipment manufacturers are expected to increase their purchases this month. A disturbing factor is the strike of General Motors tool and diemakers which, by halting new model preparations, may necessitate postponement of deliveries of steel to go into these models. More progress is being made in the direction of price stability. . . . Pig iron production in June (p. 28) was 27.5 per cent ahead of the daily rate in May when the coal strike restricted blast furnace operations.

• • •

Tungsten, Titanium

Firth-Sterling Steel Co. believes (p. 29) that increased use of Cutanit, a combination recently developed of cemented tungsten carbide and cemented titanium carbide, will lead to an easement in the demand for tungsten. Not only does this material require less tungsten, but the company expects it to displace considerable existing demand for high-speed steels containing large percentages of tungsten. . . . Army air corps last week (p. 26) opened bids on large numbers of bombardment and training planes required under its expansion program. . . . Latest application of soybean plastic in Ford cars (p. 40) is the rear trunk door; driver's seat on the new Ford tractor is made of grass fibers, pressed to shape with suitable bonding material.

• • •

Aircraft Taking Tools

A national tax commission to study overlapping taxation by federal and state governments is proposed (p. 34) in a bill introduced in the senate; one aim is to free business of nuisance factors now associated with taxation. House rules committee has approved a resolution to investigate the national labor relations board. Chamber of commerce of the United States holds the administration's newly proposed spend-lend program and the Mead bill providing for government loans to small business would accelerate progress toward state capitalism. . . . The airplane industry today (p. 23) accounts for 20 per cent of domestic machine tool sales; it also uses other equipment and in wide variety. . . . Computation of stresses in rigid steel frames is possible through development (p. 36) of new testing machines.

• • •

Encourage Expansion!

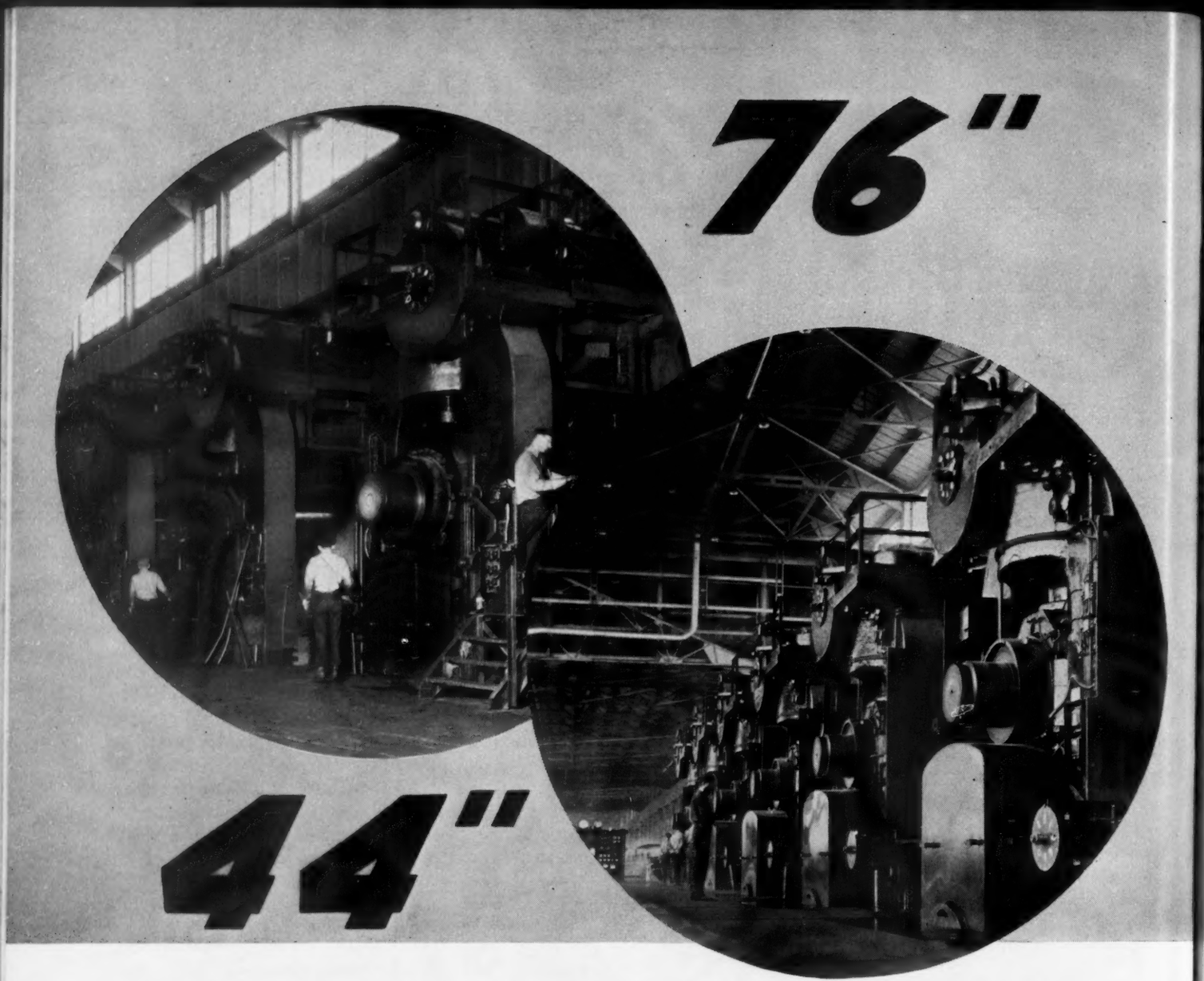
This week's contributor to STEEL's Forum on Re-Employment (p. 46) is Ralph E. Flanders, president, Jones & Lamson Machine Co. and Bryant Chucking Grinder Co., Springfield, Vt. He proposes organized governmental employment, expanded and contracted on the basis of a flexible budget based on the unemployment index, and balanced under normal business conditions. Needed now, he holds, is a national policy of encouraging business expansion. . . . New windowless plant of Simonds Saw & Steel Co. (p. 48) is in full operation. Under conditions of controlled illumination and conditioned air, operations formerly requiring 17½ acres are conducted here in a single 5-acre room. Operating two 8-hour shifts, machinery has double the opportunity to wear itself out before obsolescence overtakes it.

• • •

Need More Ventilation

Seventy per cent of metal producing and metalworking plants suffer (p. 52) from poor ventilation; modern ventilating systems result in increased output during hot weather. . . . Recent developments in continuous electrolytic cleaning of strip make possible a base metal surface (p. 54) better adapted to subsequent plating, polishing and finishing, assuring product of higher quality and reducing rejects from poor finishing. . . . Hard surfacing is being employed (p. 58) to protect turbine blade tips from destructive cavitation. . . . New and revised standards and tentative standards were recommended in unprecedented numbers (p. 69) at the recent annual meeting of the American Society for Testing Materials. . . . A sucker rod producer has reduced rejects (p. 64) by an improved manufacturing procedure.

E C Kreutzberg



Two Modern Strip Mills are Teamed Together for Better Service to Inland Customers

In 1932 Inland installed one of the country's first wide continuous strip mills. This 76" unit now has a new running mate . . . . one of the country's highest speed mills, capable of rolling a mile of steel a yard wide in 2½ minutes.

This new 44" mill increases Inland's flat rolled steel capacity 45,000 tons per month, greatly expanding our facilities for prompt service to customers. Its higher speed and numerous improved mechanical features also permit more effective control over quality and uniformity of output.

Temperature control, for example, is made automatic as the hot strip enters the finishing stands, by an electric pyrometer which "looks" at the steel, records its temperature and sounds a warning if there is any variation.

Important also to steel buyers is the fact that this new mill is matched with equally modern steel making and finishing equipment . . . all of it new within the past few years, from blast furnace and open hearths to cold finishing mills, annealing furnaces, tin mills and galvanizing department.

We are confident that these new facilities now enable us to produce, not only more, but better sheets and strip. Your nearest Inland office will make this improved service promptly available to you.

INLAND STEEL CO.

38 South Dearborn Street, CHICAGO • District Offices: DETROIT • KANSAS CITY • MILWAUKEE • ST. LOUIS • ST. PAUL

SHEETS STRIP TIN PLATE BARS PLATES FLOOR PLATES STRUCTURALS PILING RAILS TRACK ACCESSORIES REINFORCING BARS

Airplane Industry Fast-Growing Market for Production Equipment . . .

By BERT D. LYNN

■ HOW important is America's aircraft industry as a market for machinery and other production equipment?

Expanding remarkably in recent months, this outlet today accounts for 20 per cent of domestic machine tool sales. Last year it took 10 per cent, in 1937 only 2 per cent, according to National Machine Tool Builders' association.

Makers of planes, engines, propellers and parts now have nearly $100,000,000 invested in plant and equipment. Already this year 35 manufacturers have scheduled programs for new production facilities amounting to more than $17,000,000.

Equipment buying currently is for expansion rather than replacement. Even obsolescence, hastened by the close tolerances and great precision of aircraft work, generally results in greater capacity. For when a machine no longer attains the required accuracy, a new unit is installed, the old one being relegated to less precise tasks.

Nevertheless, exacting requirements shorten the life of this industry's machine tools to much less than the generally-accepted 10-year average. In the past year alone equipment is said to have suffered the equivalent of three years' normal wear. A leading engine producer discloses that some of its machines but six or seven years old already lack necessary accuracy.

One of today's fastest-growing industries, aircraft manufacturing admittedly is the pacemaker in precision metalworking. Its rapid technical advance has thrown overboard many engineering precedents, has put to practical use new methods and materials, established new standards which are being widely adopted. Because of its developments all industry is conscious as never before of speed, weight-elimination, power and safety.

To keep up with the constant change in design effected by their research departments, airplane companies commonly must restrict machinery purchases to standard models adaptable to frequent changeover. Special equipment is specified only when essential.

Building the modern all-metal ship of light, tough alloys, planemakers need all types of machine tools and other metalworking equipment. These plants buy aluminum, duralumin, stainless, chromium-molybdenum and nickel steels in standard sizes of sheets, bars or tubes, and must perform difficult shearing, punching, swaging, forming and machining operations during fabrication.

With mass production still a re-

■ In this survey of the aircraft industry's requirements, Mr. Lynn, member of STEEL'S editorial staff, portrays a remarkably growing market for precision metalworking equipment, finds that airplane, engine and parts builders today account for 20 per cent of domestic machine tool sales.

■ Vital to the modern all-metal craft is proper heat-treating of its components. This partsmaker uses special gas and electric furnaces for nitriding, scale-free hardening and other treatments

mote goal, airplane construction is almost wholly a job-lot technique. Wings, tail groups, fuselages, landing gear, engine mountings, engines, propellers and instruments move from subassembly departments or receiving rooms to the main production line where craft are assembled in groups.

For holding subassembly work during fabrication the plants construct ingenious jigs of welded steel shapes.

Employed in forming the numerous sheetmetal parts required are hydraulic presses with wood, zinc, or wood and rubber dies; drop hammers; and hydraulic stretching presses. One press builder recently delivered a 5000-ton hydraulic unit for aircraft manufacture.

Need Many Hand Tools

Hand work in parts forming is largely facilitated with power hammers, crowning rolls or wheeling machines. For general purposes small hand tools are needed in both pneumatic and electric types. Included are: Drills, screw drivers, riveters, metal sanders, welders and grinders.

Recent improvements in welding and riveting as assembly methods have made it possible to greatly reduce "skin friction" in airplanes. Spotwelding of stainless steel and aluminum sheet for exterior covering is increasingly popular. In general use are portable and stationary welders of all types. Development of the "flush" method has maintained extensive employment of riveting. With the average ship requiring some 45,000 rivets, it is found practical to operate gang machines driving 8 to 10 rivets simultaneously.

Other production wants involve handling systems, heat treating and melting furnaces, foundry and power equipment.

Design changes cause continual retooling in airplane factories. Although building nearly all their own jigs, dies and fixtures, plants require from toolmakers taps, drills and other special products.

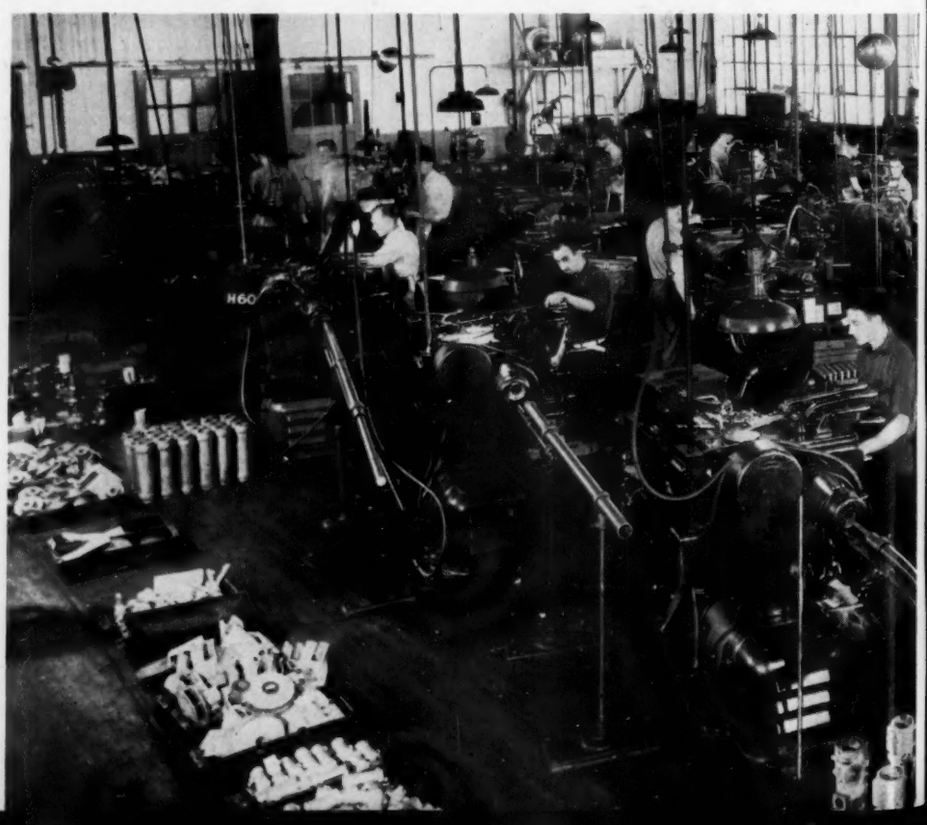
In connection with its latest expansion program, almost doubling its Middle River, Md., aircraft plant, the Glenn L. Martin Co. bought machinery costing $750,000, other equipment $150,000. Purchases included turret lathes, milling machines, jig borers, horizontal and vertical shapers, multiple drills, drop hammers, electric furnaces and salt baths, electric industrial trucks, chain hoists, overhead trolley systems and miscellaneous tools.

Special engineering problems confront those supplying equipment to the engine builders, striving always to bring down weight and resistance, increase power, speed and reliability. At the same time, motor producers encounter less frequent revision of design than the plane constructors, can more closely approach mass production. Last year's output exceeded 6000 engines, each with 3 to 18 cylinders. Parts are largely standardized and interchangeable.

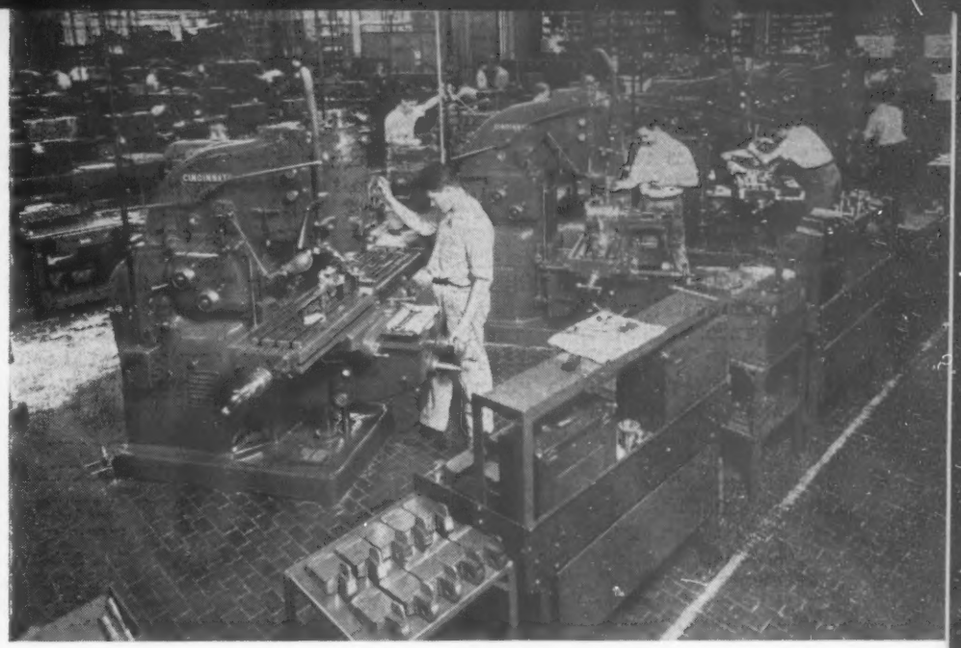
Considered one of the most complex mechanisms produced by any industry, the modern aircraft motor averages about 700 parts, is a marvel of precision. Latest achievement is a 24-cylinder, double-V unit turning out 2400 horsepower and weighing little more than a ton.

Components must often be held in surface accuracy within 2 microinch profilometer readings. Due to such exactness, reports J. Carlton Ward Jr., general manager of United Aircraft's Pratt & Whitney engine division, his firm's large Canadian assembly plant encountered in eight years but one Pratt & Whitney part which did not fit perfectly.

Fabricating the finest alloys of steel and other metals in scores of



■ Typical of machinery manufacturers engaged in production of airplane parts is Ex-Cell-O Corp., Detroit. Shown in its precision shops are 39 turret lathes, many working on aircraft products. Photo, courtesy Warner & Swasey Co.



■ **Glenn L. Martin Co., major plane builder, operates many horizontal and vertical milling machines in its Middle River, Md., plant. Company recently spent $900,000 on new machinery and equipment for an assembly addition. Photo, Cincinnati Milling Machine & Cincinnati Grinders Inc.**

✦

machining operations, engine builders constitute a fertile market for metalworking equipment. Demonstrating their needs are items in use at the Lycoming engine plant of Aviation Mfg. Corp., Williamsport, Pa.: Milling machines, grinders, boring machines, drills, turret lathes, reamers, drill presses, lappers, and lathes.

High brinell ratings of steel parts for engines demand great rigidity and power in machining equipment. On the softer materials cutting speeds as high as 600 to 700 feet per minute are not unusual. Much metal is removed in some cases—one type of cylinder barrel weighing 45 pounds in the rough and 7.33 pounds finished.

Largest engine plant construction project in recent years is that of Allison Engineering Corp., a General Motors division, now erecting a $6,000,000 factory addition at Indianapolis. This will increase by 200 per cent the present floor space of 100,000 square feet, will boost output from 1 up to 40 units weekly. Some equipment already has been ordered, considerable still is to be placed.

Propellers today are of drop-forged aluminum, duralumin, and solid or hollow steel in two, three and four-bladed types. The recent development of controllable and reversible pitch and full-feathering, requiring intricate gearing in hubs, has complicated their manufacture considerably.

So precisely are propellers and their parts constructed and assembled that a "Swiss watch balance" can be made of an entire unit. What this involves is illustrated at one plant where 400-pound hub forgings of alloy steel must be machined to a final weight of 90 pounds.

Equipment in this field is featured by extrusion presses ranging up to 3500 tons, used for extruding billets into shapes from which propellers are forged.

As production volume increases, a growing tendency is noted to "farm out" aircraft components, thus effectively augmenting the industry's capacity. Builders usually do the most difficult jobs themselves, allotting orders for simpler parts or those for which another firm has found a more efficient manufacturing process.

Many companies in allied industries such as the machinery and automotive are entering manufacture of aeronautical products. Especial interest is evinced in production of stainless steel assemblies on a subcontracting basis.

These makers of parts and accessories assume an important role as equipment buyers. Of the machinery now sold to the aircraft industry, it is estimated only half goes to direct producers of planes, engines and propellers, half to subcontractors.

Partsmakers Buying Machinery

Thompson Products Inc., Cleveland, builder of precision specialties, since the beginning of this year has expended $250,000 on equipment for its new aircraft parts division. Another tool company proposes to spend $150,000 in adapting its facilities to the manufacture of airplane accessories.

Numerous production processes and items of equipment have been especially developed to meet demands of the aircraft industry. Certain methods of thread grinding were developed for its use, and since have spread to other fields. A partsmaker designed a new sheetmetal shrinker, automatic punch and riveter, and sheetmetal former. The latter also was widely adopted.

Largely resurrected by this industry were hydraulic presses and drop hammers for die-forming of sheetmetal. Gang punching with the power press brake is said to be an aircraft invention.

To meet a need for inexpensive and quickly-made dies the industry perfected its own method of casting zinc dies, replacing the slower and more difficult cutting or "die sinking" system. Zinc is cast in sand molds made from plaster forms. Cast practically to finished

form, the dies require little or no work for their completion.

Much improvement in surface finishing is attributed to aeronautics. Bringing out faults in materials, surface finishes are used to test perfection even more than to aid appearance. Extensively employed is the new "superfinishing".

Increasing attention is given by the industry and government to research and testing. In the last five years 37 leading producers of planes, engines and propellers spent $44,000,000 for this purpose, it is indicated by Aeronautical Chamber of Commerce of America. Federal allotments for research during the fiscal year 1940 total more than $10,000,000. Typical equipment comprises machines for testing tension, compression and torsion in metals; instruments for measuring stress, fatigue and creep; X-ray for examining physical qualities of cast and forged parts; engine test chambers; and wind tunnels for models and full-sized craft.

Although machinery and equipment makers were slow to realize potentialities of the aircraft industry, more than 300 firms now supply its production requirements. Continued growth of this market is anticipated, despite possibility its extremely rapid expansion during the past several years will become more moderate. Production of aircraft and parts in 1937 amounted to $115,000,000; in 1938, $160,000,000; this year it is expected to reach $200,000,000.

Pointed to by this industry is the fact its growing mechanization is accompanied by a steadily rising payroll. Its employment in 1934 was only 15,000, while today it approximates 50,000.

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■ **In this spacious 670,000-square foot plant at East Hartford, Conn., Pratt & Whitney division of United Aircraft turns out air-cooled radial engines up to 1400 horsepower, uses nearly every type of precision metalworking tool. Swelling its backlog are French orders exceeding $19,000,000**

BIDS OPENED UNDER AIR CORPS EXPANSION PROGRAM

WASHINGTON

Army air corps last week opened manufacturers' bids for large numbers of bombardment and training planes required under its expansion program. Postponed to early August was the scheduled opening of other bids for interceptor pursuit and observation craft. These purchases are to be made under the army's $293,985,547 supplemental appropriation measure, just signed by the President.

Enactment of the bill practically concludes congressional action on the emergency defense program.

Funds are provided for 2467 new warplanes. With units now on hand or on order, these will boost air corps strength to 5500 first-line craft by close of fiscal year 1941.

Money also is made available for training pilots and mechanics and for building five new air bases and a depot. Bases are to be in Panama, Alaska, Puerto Rico, and in northeastern and southeastern United States.

A total of $27,000,000 is allotted for augmenting defenses of the Panama Canal. Coastal and antiaircraft batteries guarding the Canal Zone are to be nearly doubled.

Included is provision for enlarging the "educational orders" program initiated last year, under which selected factories are given small munitions orders to gear them for war-time production.

To bring the air corps' strength to at least 5500 planes within the next two years, congress has now provided funds for more than 3500 new craft. Acting with a minimum of delay, the war department ordered nearly 1000 in the past two months, soon will make awards for the remaining 2500.

Of those already placed, 527 are single-engine pursuit ships credited unofficially with speeds up to 400 miles per hour, while about 190 are attack bombers believed equally swift.

How many of each type are to be purchased is a closely-guarded secret, but ten classes in all are needed: Light, primary, basic and advanced training planes; two and four-engined bombers; one and two-engined interceptor pursuit; multiplace fighters; and observation craft.

Industrial Building Cost Below 25-Year Average

■ Industrial building costs in the first half of 1939 were 8 per cent below the 25-year average, according to the Austin Co., Cleveland, engineer and builder. Company's cost chart records average cost per square foot of one-story daylight plant construction by quarters since January, 1913.

Current cost is $1.40 per square foot, compared to a 25-year average of $1.52. It compares with a record high of $2.67 in spring of 1921 and a depression low of $1.08 during the first half of 1933. These costs do not include heating, lighting and plumbing.

Ingots Up 73% In First Half

■ PRODUCTION of 3,130,381 gross tons of steel ingots in June brought total output for first half to 18,629,927 tons, 73 per cent more than 10,788,583 tons in the corresponding period, 1938, according to the American Iron and Steel institute.

Output in June was substantially above the May total of 2,917,876 tons and was almost double the 1,632,843 tons of June, 1938.

The industry operated at an average of 53.44 per cent of capacity in June, against 48.24 per cent in May and 28.36 per cent in June, 1938. Operations for first half averaged 52.74 per cent, and 31.08 per cent in the 1938 period.

Ingot production last month averaged 729,693 tons per week, 11 per cent above May, when weekly average was 658,663 tons. In June, 1938, the average was 380,616 tons.

Average of STEEL's weekly estimates of operations for June was 53.42 per cent, compared with the institute's 53.44 per cent, based on actual output.

Orders, Shipments Up Sharply During May

■ New orders, shipments and unfilled orders advanced sharply in May, according to a survey covering 153 large and small manufacturing companies by National Industrial Conference board, New York. Recovery virtually offset declines in April.

Inventory values, reported by 143 companies, rose 1 per cent during May, compared with a 1 per cent decline in April. May inventories were 14 per cent above May, 1938.

Percentage changes in the four operating factors:

	Number Companies Reporting	Change from April, '39	Change from May, '38
Inventories	143	+ 1	—14
Shipments	144	+ 5	+23
New Orders	81	+13	+47
Unfilled orders	71	+ 4	+17

■ Factory sales of mechanical stokers in May totaled 5238, compared with 3591 in April, according to the bureau of the census.

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended July 8	Change	Same week 1938	Same week 1937
Pittsburgh	36	—11	15	67
Chicago	44.5	— 6.5	24	70
Eastern Pa.	32	— 6	22	65
Youngstown	38	—15	27	76
Wheeling	62	—17	44	77
Cleveland	27.5	—23.5	15.5	47
Buffalo	32.5	— 2.5	30	88
Birmingham	65	— 6	42	96
New England	32	None	33	80
Cincinnati	28	—37	36	93
St. Louis	31	—11	33.3	93
Detroit	56	— 1	29	95
Average	42	—12	24	74

Steel Ingot Statistics

	Calculated Monthly Production—All Companies —Open Hearth— Gross tons	Per cent of capacity	—Bessemer— Gross tons	Per cent of capacity	—Total— Gross tons	Per cent of capacity	Weekly production, all companies, gross tons	Number of weeks in month
1939	**Reported by Companies which in 1938 made 97.31% of Open-Hearth and 99.90% of Bessemer.**							
Jan.	3,069,011	55.73	147,642	27.26	3,216,653	53.18	726,107	4.43
Feb.	2,785,629	56.02	196,382	40.16	2,982,011	54.60	745,503	4.00
March	3,201,132	58.13	194,889	35.99	3,396,021	56.14	766,596	4.43
April	2,781,008	52.15	205 977	39.28	2,986,985	50.99	696,267	4.29
May	2,747,550	49.89	170,326	31.45	2,917,876	48.24	658,663	4.43
June	2,942,715	55.18	187,666	35.78	3,130,381	53.44	729,693	4.29
6 mos.	17,527,045	54.40	1,102,882	34.87	18,629,927	52.74	720,136	25.87
1938	**Reported by Companies which in 1938 made 98.67% of Open-Hearth and 99.90% of Bessemer.**							
Jan.	1,634,224	30.28	99,941	18.27	1,734,165	29.17	391,459	4.43
Feb.	1,572,009	32.26	125,443	25.39	1,697,452	31.63	424,363	4.00
March	1,846,517	34.21	157,687	28.82	2,004,204	33.72	452,416	4.43
April	1,786,942	34.19	132,100	24.93	1,919,042	33.34	447,329	4.29
May	1,669,455	30.93	131,422	24.02	1,800,877	30.30	406,519	4.43
June	1,513,715	28.96	119,128	22.48	1.632,843	28.36	380,616	4.29
6 mos.	10,022,862	31.80	765,721	23.96	10,788,583	31.08	417,031	25.87
July	1,846,319	34.29	127,998	23.45	1,974,317	33.29	446,678	4.42
Aug.	2,340,363	43.36	196,739	35.96	2,537,102	42.68	572,709	4.43
Sept.	2,440,192	46.80	206,937	39.15	2,647,129	46.09	618,488	4.28
Oct.	2,882,827	53.41	223,158	40.78	3,105,985	52.25	701,125	4.43
Nov.	3,357,167	64.23	201,196	37.97	3,558,363	61.81	829,455	4.29
Dec.	2,971.834	55.19	158,912	29.11	3,130,746	52.79	708,314	4.42
Total	25,861,564	40.71	1,880,661	29.20	27,742,225	39.65	532,072	52.14

Percentages of capacity operated for 1939 are calculated on weekly capacities of 1,243,153 gross tons open-hearth ingots and 122,248 gross tons bessemer ingots; total, 1,365,401 gross tons; based on annual capacities as of Dec. 31, 1938, as follows: Open-hearth ingots, 64,817,994 gross tons; bessemer ingots, 6,374.000 gross tons.

Percentages of capacity operated for 1938 are calculated on weekly capacities of 1,218,342 gross tons of open-hearth ingots and 123.514 gross tons of bessemer ingots; total, 1,341,856 gross tons; based on annual capacities as of Dec. 31, 1937, as follows: Open-hearth ingots, 63,524,356 gross tons; bessemer ingots, 6,440,000 gross tons.

PRODUCTION

■ STEELWORKS operations last week declined 12 points to 42 per cent, due to time lost over the holiday. One district was unchanged, while the other 11 were reduced. Last year the rate was 24 per cent;

Youngstown, O.—Production was about 38 per cent, 15 points under the preceding period. The week closed at 53 per cent and schedules for this week indicate 1 point lower, or 52 per cent, as one open hearth

Birmingham, Ala.—Averaged 65 per cent, though recovering to 80 per cent at the close. Ensley rail mill was to be reopened Monday for short run.

Detroit—Off 1 point to 56 per cent. One producer idle early in the week resumed with more open hearths Wednesday. Increase to 65 per cent is expected this week.

Cincinnati—Dropped to 28 per cent, from 65 in the preceding week. Shutdown of the Middletown, O., furnaces for a new mill installation (see page 32) accounted for most of the loss.

Cleveland—Declined 23.5 points to 27.5 per cent, the result of extended holiday closings.

St. Louis—Down 11 points to 31 per cent. Two mills withdrew furnaces from the active list.

Pittsburgh — Reduction of 11 points to 36 per cent resulted from several causes, principally holiday interruptions. Most of the loss is expected to be regained this week.

Wheeling—Lost 17 points to 62 per cent.

Buffalo—Off 2.5 points to 32.5 per cent, one open hearth undergoing repairs.

Central eastern seaboard — Receded 6 points to 32 per cent for the week's average, with rebound to 39 per cent at the close. One leading producer is engaged at 60 per cent.

Chicago—A decline of 6.5 points to 44.5 per cent is expected to be recovered this week or next.

New England—Steady at 32 per cent.

Forecast 9.9 Per Cent Gain in Carloadings

■ A rise in revenue freight carloadings of 9.9 per cent in third quarter of this year over the comparable three months in 1938 is estimated by the 13 shippers' advisory boards. This estimate places loadings for the period at 5,268,278 cars. Only two boards, central western, and trans-Missouri-Kansas forecast lower loadings than a year ago for this period. Anticipated drop in these districts is based mainly on smaller loadings of grain and citrus fruits.

June Pig Iron Production Gains 27.5 Per Cent; 11 More Stacks In

■ PRODUCTION of coke pig iron in the United States in June rebounded from the declines experienced in April and May. With 10 per cent more stacks active at the end of June, average daily output rose to 70,647 gross tons, an increase of 15,243 tons, or 27.5 per cent, compared with a daily average of 55,404 tons in May. The June rate was highest since March when daily output was 77,201 tons. Production averaged 35,358 tons daily in June, 1938.

Total output in June was 2,119,422 gross tons, 401,900 tons, or 23.4 per cent, more than 1,717,522 tons made in May. This was largest monthly figure since March, with 2,393,255 tons. June, 1938, the total was 1,060,747 tons.

Output for first six months this year was 12,521,131 tons, a gain of 4,590,133 tons, or 57.9 per cent, compared with 7,931,098 tons in the like period, 1938. Total for the first six months of 1937 was 19,771,335 tons.

Relating production to capacity, operations in June averaged 51.4 per cent. This compared with 40.2 per cent in May, and 49.8 per cent in April. Rate for June, a year ago, was 25.5 per cent.

Stacks in blast June 30 totaled 117, an increase of 11 compared with 106 at the close of May. During June, two merchant stacks and 13 steelworks furnaces became active. Two merchant and two steelworks units were blown out or banked. The total 117 was highest since March 31 when 123 were in operation and compares with 102 in April; 121 in February, and 118 in January. Only 67 were operating at the end of June, 1938, lowest number for any month that year.

Furnaces resuming during June were: In Alabama: Pioneer No. 1, Republic Steel Corp.; Ensley No. 5, Tennessee Coal, Iron & R. R. Co.; Woodward No. 1, Woodward Iron Co. In Illinois: South Works New No. 5, Carnegie-Illinois Steel Corp. In Indiana: Gary No. 9, Carnegie-Illinois Steel Corp. In Kentucky: Ashland No. 1, American Rolling Mill Co. In Maryland: Maryland "F", Bethlehem Steel Co. In Massachusetts: One Everett, Mystic Iron Works. In New York: One Buffalo, Republic Steel Corp. In Ohio: Ohio No. 1, Carnegie-Illinois Steel Corp.; One Canton and Youngstown No. 2, Republic Steel Corp.; Steubenville No. 1, Wheeling Steel Corp.; Campbell No. 3, Youngstown Sheet & Tube Co. In West Virginia: One Riverside, Wheeling Steel Corp.

Stacks blown out or banked were: In Alabama: Woodward No. 3, Woodward Iron Co. In Colorado: Minnequa "E", Colorado Fuel & Iron Co. In Illinois: Federal "B", Interlake Iron Corp. In Pennsylvania: Monongahela No. 3, National Tube Co.

Port Henry blast furnace No. 1 of Witherbee Sherman Corp., Port Henry, N. Y., which was partially dismantled in 1937, is now regarded as abandoned. This stack, built in 1872-73, and last rebuilt in 1921, has been inactive for a number of years. It had an annual capacity of 108,000 tons of basic, foundry, malleable and low-phosphorus pig iron. With removal of this stack, total potential furnaces in the United States is reduced from 236 to 235.

MONTHLY IRON PRODUCTION

Gross Tons

	1939	1938	1937
Jan.	2,175,423	1,444,862	3,219,741
Feb.	2,060,183	1,306,333	3,020,006
March	2,393,255	1,470,211	3,470,470
April	2,055,326	1,388,008	3,400,636
May	1,717,522	1,260,937	3,545,180
June	2,119,422	1,060,747	3,115,302
Tot. 6 mo.	12,521,131	7,931,098	19,771,335
July		1,213,076	3,501,359
Aug.		1,495,514	3,616,954
Sept.		1,683,097	3,417,960
Oct.		2,067,499	2,891,026
Nov.		2,286,661	2,007,031
Dec.		2,212,718	1,503,474
Total		18,889,663	36,709,139

AVERAGE DAILY PRODUCTION

Gross Tons

	1939	1938	1937	1936
Jan.	70,175	46,608	103,863	65,461
Feb.	73,578	46,655	107,857	63,411
March	77,201	47,426	111,951	66,004
April	68,511	46,267	113,354	80,316
May	55,404	40,675	114,360	85,795
June	70,647	35,358	103,843	86,551
July		39,131	112,947	83,735
Aug.		48,242	116,676	87,475
Sept.		56,103	113,932	90,942
Oct.		66,694	93,259	96,509
Nov.		76,222	66,901	98,331
Dec.		71,378	48,499	100,813
Ave.	69,122	51,752	100,573	83,832

JUNE IRON PRODUCTION

	No. in blast last day of June	No. in blast last day of May	Total tonnage Merchant	Total tonnage Non-merchant
Alabama	14	12	65,625*	117,014*
Illinois	7	7	22,873	148,833
New York	8	7	35,022	107,384
Ohio	28	23	51,213	442,509
Penna.	32	33	29,092*	526,767*
Colorado	1	2		
Indiana	9	8	8,172*	392,847
Maryland	6	5		
Virginia	1	1		
Kentucky	2	1		
Mass.	1	0		
Michigan	3	3		
Minnesota	1	1	10,950	161,121
Missouri	0	0		
Tenn.	0	0		
Utah	1	1		
West Va.	3	2		
Total	117	106	222,947*	1,896,475*

*Includes ferromanganese and spiegeleisen.

Ford Foundation Starts $1,525,000 Home Project

■ Construction will be started this week on a $1,525,000 housing project in Dearborn, Mich., under sponsorship of the Ford foundation. It will include a community business center, 15 apartment buildings and 53 single homes, all of modern steel, reinforced concrete and brick construction. Estimates indicate 600 tons of steel will be required for the apartment buildings. An additional 200 tons will be needed for the business center.

Contracts for the construction of the first group of apartments have been let to the Byrne Organization, which has pioneered the use of lightweight structural steel in modern home construction.

Project, known as the Springwells Park subdivision, covers about 90 acres, platted last fall as part of a new residential community embracing an area of 1069 acres which ultimately will provide modern housing for an estimated 16,000 persons. Houses will be for sale; apartments for rent. The latter are of the two-story walkup and terrace type, will have air conditioning systems, electric garbage disposal units, other innovations.

RATE OF OPERATION

(Relation of Production to Capacity)

	1939[1]	1938[2]	1937[3]	1936[4]
Jan.	51.0	33.6	76.6	48.2
Feb.	53.5	33.6	79.5	46.4
March	56.1	34.2	82.5	48.5
April	49.8	33.4	83.7	59.1
May	40.2	29.4	84.3	63.1
June	51.4	25.5	76.6	63.6
July		28.2	82.9	61.5
Aug.		34.8	85.7	64.3
Sept.		40.5	83.7	66.9
Oct.		48.0	68.4	71.0
Nov.		55.0	49.3	72.3
Dec.		51.4	35.6	74.2

[1] Based on capacity of 50,198,920 gross tons, Dec. 31, 1938; [2] capacity of 50,606,400 gross tons, Dec. 31, 1937; [3] first half on capacity of 49,512,737 tons, Dec. 31, 1936—second half on capacity of 49,727,737 tons, June 30, 1937; [4] capacity of 49,777,893 tons, Dec. 31, 1935. Capacities by American Iron and Steel institute.

Firth-Sterling Acquires Titanium Carbide, Important to Arms Programs

■ AN INFANT industry, important to world armament and America's national defense, has been acquired by Firth-Sterling Steel Co., McKeesport, Pa. It is the American Carbide Alloys Corp., with equipment and stocks of finished and raw materials at Lewistown, Me., and Detroit, and exclusive United States rights for the manufacture of Cutanit, a cemented titanium carbide alloy.

Development of this cutting material in Europe has paralleled the increase in armament production, since its use in cutting tools has lent tremendous impetus to the manufacture of big guns, rifles, shells and other war materials. Its use has grown from 9900 pounds in 1935 to 44,000 pounds in 1937.

Primary value of Cutanit, according to L. Gerald Firth, president of the McKeesport firm, is that present cemented tungsten carbide materials are given greatly increased efficiency for steel cutting by a percentage of titanium carbide, thus forming a "double carbide of tungsten and titanium." This double carbide is the basis of the Cutanit patents which have caused "tremendous development in the use of cemented carbides for steel cutting in Europe."

Mr. Firth explained one pound of tungsten made up in carbide form for use as tool tips is equivalent to the use of many times that amount of this hardening element in the form of high speed tool steels. A comparatively small amount of tungsten in carbide form particularly in combination with titanium carbide, can thus displace—as it has in Europe—large quantities of high speed steel. The relatively small amount of tungsten required for cemented carbides can be provided in the United States.

Tungsten Supply Uncertain

Principal source of tungsten is China, and the war in that country has cut exports almost in half during the first quarter this year, compared to the same period in 1938. Until late in 1937, according to Mr. Firth, Shanghai was the outstanding port of shipment for Chinese tungsten ore, but none was exported through the port in 1938 or 1939.

As an essential mineral in armament production, tungsten skyrocketed in value upon the outbreak of the World war; and "the price remained at an exaggerated figure until hostilities ceased."

War demands resulted in the discovery of the great China deposits and also scattered deposits in California, Colorado, Idaho, Montana, Nevada and Washington.

Mr. Firth also points out that even since the war, difficulties have hindered the production and use of tungsten.

"Mining it in this country has produced unique problems, and wide price fluctuations have rocked both the domestic and foreign markets. These facts have special importance because the material is so indispensable to a number of our industries.

"Under normal peace-time conditions, this country produces less than half of its total tungsten requirements. Under war conditions, we would fall far short of our needs.

"To these problems, the recently developed product Cutanit appears to provide, in large degree, the solution.

"The mineral employed in the manufacture of Cutanit is titanium, which is found plentifully in the United States. If the experience of Europe is repeated, its development will release a large portion of the tungsten now used in high speed tool steels for other uses where tungsten is indispensable.

"Our subsidiary Wolf Tongue Mining Co., (deposits located in Colorado) alone can provide sufficient tungsten for all the cemented carbide tools likely to be required by this country in peace or war."

The titanium carbide composition was invented by Dr. Paul Schwarzkoph, European metallurgist, whose plants in Austria and Germany, with affiliates in Great Britain and other European countries, have produced large quantities of the material. Dr. Schwarzkoph is the sole owner of the basic patents in the titanium carbide field.

Cutanit is now being used in United States arsenals for machining shell steel.

Express Car 14 Per Cent Lighter

■ **Weight was reduced 18,000 pounds, or about 14 per cent under a former type, by using Mayari R high-strength steel in underframe, roof and sides of this express car, one of 25 built for Southern railway at Bethlehem Steel Co.'s Harlan shops, Wilmington, Del. This is said to be the largest order ever placed for express cars of high-strength steel**

Service Medals to 56 Tennessee Co. Employes

■ Tennessee Coal, Iron & Railroad Co., Birmingham, Ala., during second quarter awarded United States Steel Corp. service medals to 56 employes. John R. Hurley, yard superintendent, Ensley works, received recognition for 50 years' service and William Adkins, mixerman in the Ensley open-hearth department, for 40 years.

Other awards included eight of 35 years, 20 for 30 years and 26 for a quarter century. Total service of the 56 men is 1620 years. Robert Gregg, president, points to this record as an indication of the cordial relations between management and workers.

MEN OF INDUSTRY

■ MORRIS E. LEEDS, founder and president, Leeds & Northrup Co., Philadelphia, is assuming the newly created post of chairman of the board, and Charles S. Redding, vice president in charge of research and engineering, becomes president, in an expansion of the company's executive set-up, effective July 10. Mr. Redding first joined Morris E. Leeds & Co., predecessor of the present firm, for 15 months between high school and college. Receiving a B.S. in E.E. from the University of Pennsylvania in 1906, he spent two years as instructor in mechanical engineering there. He rejoined Leeds & Northrup in 1909, and has since held executive positions in every division of its activities. He became second vice president in 1918, was treasurer from 1922 to 1924, and vice president in charge of research and engineering in 1928.

♦

Raymond L. Collier, secretary, Steel Founders' Society of America, Cleveland, has been elected a director, Cleveland chapter, American Trade Association Executives.

♦

A. C. Childs has been appointed general manager of sales, Weirton Steel Co., Weirton, W. Va. W. A. Fannin has been named manager of sales of strip and strip sheet division, succeeding Mr. Childs.

♦

R. J. O. Simpson, for many years associated with L. S. Starrett Co., Athol, Mass., maker of small tools, in an official capacity, has been elected a director, to succeed the late M. B. Waterman.

♦

C. J. Edwards has been named Detroit district sales representative of LaSalle Steel Co., Chicago, succeeding the late J. R. Ide. Mr. Edwards will be located at 2210 Fisher building.

♦

Deane S. Holt, chairman, Newton, Chambers, Harnischfeger Engineering Co. Ltd., Sheffield, England, is spending several weeks in Milwaukee, his former home, visiting the Harnischfeger Corp.

♦

L. T. Rosenberg, Allis-Chalmers Mfg. Co., Milwaukee, has been elected chairman, Milwaukee section, American Institute of Electrical Engineers. R. H. Earle, Line Materials Co., has been named secretary-treasurer.

♦

Frederic M. Darner, chief engineer, Steel & Tubes Inc., has been promoted to the newly created position of assistant engineer, Republic Steel Corp., Cleveland. His duties will be concentrated chiefly on the problems of the corporation's subsidiaries and divisions. A graduate of Case School of Applied Science in 1922, Mr. Darner worked with American Rolling Mill Co. at Zanesville and Middletown, O., and as chief engineer, Erie Malleable Iron Co., Erie, Pa. He has been with Steel & Tubes, a Republic subsidiary, since 1933, first as plant engineer of the Cleveland plant, then for the last five years as chief engineer.

Morris E. Leeds

© Harris & Ewing
Charles S. Redding

Frederic M. Darner

♦

W. D. Keefe, associated with Fedders Mfg. Co., Buffalo, N. Y., 17 years, has been named vice president in charge of sales of refrigeration and air conditioning products. He succeeds H. E. Rieckelman, resigned.

♦

C. Scott Woodside, illuminating engineer, lamp division, Westinghouse Electric & Mfg. Co., Bloomfield, N. J., has been elected president, National Council of Foremen's clubs. One of the organizers of the council, Mr. Woodside has served as vice president for two years.

♦

Walter F. Strehlow, chief engineer, tractor division, Allis-Chalmers Mfg. Co., Milwaukee, has been installed as chairman, Milwaukee section, Society of Automotive Engineers. He succeeds John J. Hilt, vice president, Young Radiator Co., Racine, Wis.

♦

Carl H. Vaupel has been appointed sales manager, Diesel Equipment Corp., Chicago. Mr. Vaupel served 13 years with Fairbanks, Morse & Co., Chicago, in various capacities in the research and engineering departments, and the past two years was sales engineer for the Northern Pump Co., Minneapolis.

♦

James Tate, director of sales and advertising, Delta Mfg. Co., Milwaukee, subsidiary of Timken-Detroit Axle Co., has been elected president, Milwaukee Association of Industrial Advertisers. He succeeds Walter E. Schultz, advertising and sales promotion manager of Delta. P. C. Ritchie, Waukesha Motors Co., has been elected vice president of the association, and L. H. Billings, Falk Corp., secretary-treasurer.

♦

David R. Calhoun has been promoted to manager, industrial division, Wilkening Mfg. Co., Philadelphia, maker of heat-shaped piston rings. Webb Pedrick, engaged in the experimental and research division of the engineering department since 1936, has been appointed to Mr. Calhoun's former post in the engineering department.

♦

Lester M. Curtiss, assistant general superintendent, Lukens Steel

Co., Coatesville, Pa., has been named general superintendent in charge of all operations. He succeeds G. Donald Spackman, who, at his own request has been granted a leave of absence due to ill health. Mr. Spackman will continue to serve in an advisory capacity and will resume active duty with Lukens when his health permits.

Mr. Curtiss, following graduation from Lafayette college in 1916, was associated with a number of chemical manufacturing companies. He joined Lukens in 1919 as assistant engineer of tests, and successively became engineer of tests, assistant superintendent of plate mills, superintendent of the 140-inch and 206-inch mill; superintendent of plate mills, superintendent of production, assistant general superintendent.

♦

William O. Lippman has been appointed works manager, East Springfield, Mass., works, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. He joined Westinghouse in 1918, remaining at East Pittsburgh until 1923 when he was transferred to East Springfield as supervisor, inspection

William O. Lippman

and testing department. Later he took charge of the industrial relations department and in August, 1936, was made superintendent, fan and motored appliance division. Recently he was superintendent, air conditioning division.

♦

Dr. W. A. Wesley, of International Nickel Co.'s research laboratory at Bayonne, N. J., was awarded the American Electro-Platers' society's annual gold medal at its twenty-seventh annual convention in Asbury Park, N. J., recently, in recognition of his paper on "Physical Properties and Uses of Heavy Nickel Deposits."

R. O. Hull, of the electroplating

Lester M. Curtiss

division, E. I. du Pont de Nemours & Co., Cleveland, was awarded the Proctor memorial prize of $100 by the society. He was honored for the development of a simple method for determining irregularities in electroplating solutions before they are applied.

♦

George Schaefer, formerly rolling mill design engineer, Farrel-Birmingham Co. Inc., Ansonia, Conn., has been appointed manager of the rolling mill machinery sales division. He succeeds Norman Shaw, who has been named manager of the company's Chicago office, replacing Harry Temporal who has been transferred to the Buffalo division. Edward S. Coe has been transferred from the Chicago office to the rolling mill machinery sales division in Ansonia.

♦

J. L. Perry, president, Carnegie-Illinois Steel Corp., has been named by Assistant Secretary of War Louis Johnson, with eight other representatives of industry, to assist in distributing orders under the federal $34,500,000 war education program. Others are: E. M. Allen, president, Mathieson Alkali Works; Carl L. Bausch, vice president, Bausch & Lomb Optical Co.; F. D. Bell, president, Edgewater Steel Co., Pittsburgh; William H. Coleman, president, Bucyrus-Erie Co.; John Hancock, Lehman Bros.; Charles J. Stilwell, president, Warner & Swasey Co.; William Knudsen, president, General Motors Corp.; and Donald W. Douglas, president, Douglas Aircraft Co.

♦

E. M. Stephens, since 1938 assistant director of industrial relations, United States Steel Corp. of Delaware, Pittsburgh, has been appointed manager of industrial relations, Columbia Steel Co., San Francisco, replacing B. M. Brock, who has been transferred to the United States Steel Corp. of Delaware, Pittsburgh. Identified with the steel industry since 1928 when he joined the Chicago Bridge & Iron Co., Mr. Stephens has been with the Steel corporation since 1933.

Henry T. Lintott, who joined Columbia Steel in 1928 as chief electrician of its Torrance, Calif., plant, and since 1929 assistant general superintendent, has been promoted to general superintendent of that plant. O. A. Kresse, heretofore superintendent, open-hearth department, Torrance plant, succeeds Mr. Lintott as assistant general superintendent.

DIED:

■ FREDERICK C. A. H. LANTSBERRY, president and director, William Jessop & Sons Inc., New York, dealer in special tool steels, in that city, June 29. Born in Manchester, England, Mr. Lantsberry was managing director of the Brightside works of William Jessop & Sons in Sheffield, prior to coming to this country 11 years ago.

♦

John Didier, 81, retired founder, Rhinelander Iron Co., Rhinelander, Wis., in that city, recently.

♦

C. S. Eachus, 46, for 20 years treasurer, Kerchner, Marshall & Co., Pittsburgh, in that city, July 7.

♦

Mose Cohen, 63, head of Mose Cohen & Sons, dealers in scrap iron and steel, Cincinnati, in that city, July 2. He had been in the scrap business 35 years.

♦

John C. Pusick, 42, production manager, Union Steam Pump Co., Battle Creek, Mich., June 6 in Battle Creek.

♦

Joseph V. Banks, vice president, Reed & Prince Mfg. Co., Worcester, Mass., and manager of that company's Chicago office and warehouse, June 6.

♦

Alfred L. Sampson, 75, for 39 years shop superintendent of the Lynn, Mass., plant of General Electric Co., June 8 at his summer home in West Alton, N. H. He had been retired for a number of years.

♦

Juan R. Martinez, 39, the past five years associated with the export tractor division of Allis-Chalmers Mfg. Co., Milwaukee, in Porto Alegre, state of Rio Grande do Sul, Brazil. At the time of his death he was establishing a dealer organization for Allis-Chalmers in Brazil.

Steel Imports Off 41 Per Cent

■ MAY iron and steel imports, excluding scrap, decreased 41 per cent in volume from April, amounting to 24,171 gross tons valued at $1,405,883, compared with 41,314 tons valued at $2,703,290, according to the metals and minerals division, department of commerce. In May, 1938, imports were 20,419 tons, valued at $1,160,068.

Belgium was the chief source of supply, 8548 tons, including 4107 tons of structural shapes, 1654 tons of hoops and bands and 1020 tons of bars. The Netherlands was second with 2800 tons, of which 2783 tons was ferromanganese. British India was third with 2608 tons of pig iron and Canada sent in 2233 tons, of which 1212 tons was spiegeleisen.

Structural shapes formed the largest class imported, 5008 tons, 4107 tons from Belgium, 882 tons from France and 19 tons from Mexico. Ferromanganese was second at 4670 tons and pig iron third with 3219 tons, including 2608 tons from British India, 511 tons from Canada and 100 tons from Sweden.

Scrap imports in May rose to 3971 tons valued at $37,282 from 2769 tons valued at $29,366 in April. In May, 1938, scrap imports totaled 395 tons valued at $5207. Canada shipped 3917 tons, and Sweden 54 tons.

FOREIGN TRADE OF UNITED STATES IN IRON AND STEEL
Gross Tons

	1939		1938	
	Exports	Imports	Exports	Imports
Jan.	362,672	27,664	586,294	29,631
Feb.	359,690	19,149	460,640	19,589
March	474,360	25,369	526,883	11,827
April	394,008	44,083	489,202	21,237
May	532,641	28,142	540,639	20,814
June	.....	.....	312,021	15,887
July	.....	.....	263,699	14,728
Aug.	.....	.....	242,139	20,041
Sept.	.....	.....	346,068	27,958
Oct.	.....	.....	425,431	26,445
Nov.	.....	.....	469,596	27,627
Dec.	.....	.....	490,095	28,767
Total	.....	.....	5,152,707	264,551

ORIGIN OF MAY IMPORTS
Gross Tons

	Iron ore	Pig iron	Manganese ore	Ferromanganese
Norway	23,846	.....	.....	1,627
Sweden	16,592	100	.....	.....
Canada	62	511	.....	.....
Mexico	231	.....	.....	.....
Cuba	21,001	.....	4,062	.....
Chile	154,750	.....	.....	.....
Iran	59	.....	.....	.....
British India	.....	2,608	4,062	.....
France	.....	.....	5	63
Soviet Russia	.....	.....	5,185	.....
Gold Coast	.....	.....	3,462	.....
Netherlands	.....	.....	.....	2,783
Poland	.....	.....	.....	117
Yugoslavia	.....	.....	.....	80
Total	216,541	3,219	16,776	4,670

	Sheets, skelp and sawplate	Structural steel	Steel bars	Hoops and bands
Belgium	153	4,094	1,020	1,654
United Kingdom	1	.....	44	316
Canada	1	.....	4	.....
Sweden	5	.....	188	.....
France	.....	882	127	77
Mexico	.....	19	.....	.....
Germany	.....	.....	25	9
Total	160	4,995	1,408	2,056

U. S. IMPORTS FOR CONSUMPTION OF IRON AND STEEL PRODUCTS
Gross Tons

Articles	May 1939	April 1939	Jan. thru May,'39
Pig iron	3,219	3,512	11,578
Sponge iron	6	152	609
Ferromanganese (1)	4,670	1,998	16,014
Spiegeleisen	1,214	1,778	8,177
Ferrochrome (2)	17	39	90
Ferrosilicon (3)	63	110	645
Other ferroalloys (4)	25	37	132
Steel ingots, blooms	1	.....	4
Billets	40	40	126
Concrete reinforc. bars	275	596	1,581
Hollow bar, drill steel	168	75	540
Bars, solid or hollow	1,408	1,795	8,362
Iron slabs	.....	.....	.....
Iron bars	47	41	276
Wire rods	863	638	4,229
Boiler and other plate	2	1	5
Sheets, skelp & saw pl.	160	325	976
Die blocks or blanks	65	1	80
Tin plate, taggers' tin and terne plate	5	..	24
Structural shapes	5,008	5,873	20,692
Sashes and frames	.....	..	5
Sheet piling	.....	462	462
Rails and fastenings	720	1,567	2,886
Cast iron pipe & ftgs.	76	72	351
Mall. iron pipe ftgs.	4	..	24
Welded pipe	389	1,652	3,342
Other pipe	364	14,467	23,846
Cotton ties	31	.	33
Other hoops and bands	2,061	1,549	9,041
Barbed wire	1,829	1,815	8,375
R'nd iron & steel wire	116	139	1,170
Tele. and telephone wire	..	1	2
Flat wire & steel strips	313	264	1,309
Wire rope and strand	143	296	939
Other wire	132	213	991
Nails, tacks, staples	621	1,419	4,168
Bolts, nuts and rivets	17	7	60
Horse and mule shoes	34	29	196
Castings and forgings	65	351	801
Total	24,171	41,314	132,141
Iron and steel scrap	3,971	2,769	12,266
GRAND TOTAL	28,142	44,083	144,407

(1) Manganese content; (2) chrome content; (3) silicon content; (4) alloy content.

American Rolling Mill Improves East Works

■ American Rolling Mill Co. has started a modernization program at its East Works, Middletown, O. The open hearth, blooming and bar, and hot strip departments were closed July 3 and employes in these departments given work on the $4,500,000 construction program.

Plans provide for the replacement of the present steam-driven blooming mill with a modern slabbing mill driven by two 5000-horsepower motors. Hot strip mill will be widened and revamped. These improvements will make possible the rolling of an entire 17,000-pound ingot at one time into a wide coil of steel a quarter of a mile long.

Other departments at East Works and other plants will operate as usual and customers' requirements will be met. Engineers estimate a month will be required to complete the improvement program, working three 8-hour shifts.

Activities of Steel Users, Makers

■ WESTINGHOUSE Electric & Mfg. Co., East Pittsburgh, Pa., has established a fellowship in Carnegie Institute of Technology, for graduate study in metallurgy. Frederick C. Hull, a graduate of University of Michigan in 1937, has been selected as the first fellow, and during 1939 and 1940 will continue studies in reactions of steel which he has been pursuing the past two years as a teaching assistant in the department of metallurgy.

♦

American Enameled Products Co. has sold its plant at Mount Pleasant, Mich., and has moved its general offices, facilities and personnel to Waukesha, Wis.

♦

Lincoln Electric Co., Cleveland, has appointed the Pittsburgh Thermoline Co., Nineteenth street, Pittsburgh, as dealer for Lincoln products in Allegheny county.

♦

T. B. Wood's Sons Co., Chambersburg, Pa., has appointed the Hartley-Rose Belting Co., Pittsburgh, as its factory branch, serving the Pittsburgh industrial area.

♦

Universal Power Corp., Cleveland, has been appointed by Mahoning Paint & Oil Co., Youngstown, O., as national exclusive distributor in this country and Canada for Spatter Nox, a new varnish-like material.

♦

Wheelco Instruments Co., Chicago, maker of indicating and control instruments, has appointed Industrial Equipment Co., Houston, Tex., and Frank P. Fischer, 1608 Audubon street, New Orleans, as Wheelco dealers in their respective territories.

♦

American Engineering Co., Philadelphia, has purchased the Diamond Machine Co., Providence, R. I., and will continue the manufacture of the Diamond face grinder in its Philadelphia plants.

♦

Delco Appliance division, General Motors Sales Corp., Rochester, N. Y., has opened a factory sales branch at 840 North Michigan avenue, Chicago, to distribute products in Illinois, Michigan, Wisconsin and Indiana. Frank L. Orcutt is office manager.

♦

Chicago office of Maas & Waldstein Co., Newark, N. J., maker of industrial finishes, has moved to a new building at 1658 Carroll avenue, which houses both the office and warehouse and provides the extra space required by the company's increased business in the mid-western territory.

MEETINGS

SILVER BAY INDUSTRIAL CONFERENCE IN AUGUST

■ TWENTY-SECOND annual conference on industrial relations, under auspices of the Industrial Service of the National Council of Y.M.C.A.'s in co-operation with a committee of representative industrial men, will be held at Silver Bay, Lake George, N. Y., Aug. 30-Sept. 2.

Subjects to be considered in formal sessions include: Management's responsibility, stabilization of employment and income; old age pensions; group health and medical care; sick benefits, medical care insurance, hospital plans; seniority; national labor relations act; collective bargaining; employe attitudes; job evaluation and salary administration; aptitude studies; foreman training; and handling grievances.

Among the speakers will be Dr. Harvey N. Davis, president, Stevens Institute of Technology, Hoboken, N. J.; Ralph A. Lind, labor relations counsel, Stevensen, Jordan & Harrison, New York; C. S. Coler, industrial relations, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.; C. R. Dooley, industrial relations manager, Socony-Vacuum Oil Co. Inc., New York; S. L. H. Burk, chief job analyst, Atlantic Refining Co., Philadelphia; and J. P. Syme, director of industrial relations, Johns-Manville Corp., New York.

E. H. T. Foster, 347 Madison avenue, New York, is executive secretary of the conference.

MIDYEAR MEETING OF SCRAP INSTITUTE IN CLEVELAND

Midyear meeting of the Institute of Scrap Iron and Steel Inc. will be conducted in Cleveland, Aug. 28-29. First day will be devoted to consideration of national matters by the board of directors and conferences by various committees. The annual golf tournament to determine the champion of the scrap industry will be held at the Beechmont club, Shaker Heights, O., on the second day. E. C. Barringer, 11 West Forty-second street, New York, is executive secretary of the institute.

FINANCIAL

WOODWARD IRON REPORTS SECOND QUARTER PROFIT

■ WOODWARD IRON CO., Birmingham, Ala., had net profit of $56,929, equal to 21 cents a share, for second quarter. This compares with net profit of $180,121, or 66 cents a share in the first quarter, and net loss of $26,429 in the second quarter last year. The company's six months net totaled $237,050, equal to 87 cents a share on the 271,042 shares outstanding. In the comparable period last year, net profit was $260,961, or 96 cents a share on 270,430 shares.

•

American Fork & Hoe Co., Cleveland, for the fiscal year ended April 30, shows net income of $554,294. This is equivalent to 66 cents a share on 514,351 no-par shares of common. Current assets as of April 30, including $2,258,642 cash, amounted to $7,937,396, and current liabilities were $575,147.

•

Van Norman Machine Tool Co., Springfield, Mass., for 24 weeks ended June 17 reports net profit of $123,287, equal to $1.39 a share on 88,829 common shares outstanding. This compares with net profit of $185,134, or $2.08 a share, for the 24 weeks ended June 18, 1938.

DIVIDENDS DECLARED

American Shipbuilding Co., Cleveland, will pay 50 cents per common share on Aug. 1 to record of July 17. The dividend is payable out of earned surplus, although the company had a net loss for the fiscal year ended June 30. This was the first time since 1933 it failed to show a profit. In the 1938 fiscal year net profit was $3.37 a share. No action was taken on the 7 per cent noncumulative preferred stock.

Allegheny Ludlum Steel Corp., Pittsburgh, declared regular quarterly of $1.75 per share on preferred, payable Sept. 1 to record Aug. 15.

Clark Equipment Co., Buchanan, Mich., dividend of 25 cents on common, payable Aug. 1 to record July 17 and additional 25 cents payable Sept. 15 to record Aug. 30. Also declared regular quarterly of $1.75 on preferred, payable Sept. 15 to record Aug. 30. On June 1 dividend of 25 cents was paid on common.

Pneumatic Scale Corp. Ltd., Norfolk Downs, Mass., 30 cents on common, payable July 15 to record July 6. Paid same amount March 1.

Maytag Co., Newton, Iowa, regular quarterly $1.50 on $6 preferred stock and 75 cents on $3 preference, both payable Aug. 1 to record July 15.

A. M. Byers Co., Pittsburgh, $1.75 a share on preferred arrears, payable Aug. 1 to record July 10. This dividend was due May 1, 1934. Accrued interest on the dividend up to Aug. 1. 1939, also was declared, amounting to approximately 46 cents a share.

Crucible Executives Honor 87-Year-Old Craftsman

■ Jack Luland's 66 years of service were acclaimed recently by Crucible Steel Co. executives, headed by Raoul E. Desvernine, president, at a special reception and luncheon in his honor at the executive offices in the Chrysler building, New York. Hale and hearty at 87, he reports daily to Crucible's Atha works in Harrison, N. J.

Mr. Desvernine (left) also greeted another Atha worker, Frank Morgan, (right), who has been a regular employe 59 of his 73 years.

Luland was said to be "one of the first to demonstrate the proper heat-treating and advantages of modern high-speed steels. His travels as company representative carried him all over the United States, and included a trip to England to consult on the heat treatment of heavy projectiles. His experiments with improved heat treatment made possible the piercing of the then impenetrable Krupp armor plate."

Many of Crucible's workers received lessons in heat-treating from this craftsman.

Windows of WASHINGTON

By L. M. LAMM
Washington Editor, STEEL

WASHINGTON

■ CREATION of a national tax commission to study overlapping taxation by federal and state governments is proposed in a bill by Senator W. Warren Barbour, New Jersey. Measure embodies suggestions by Secretary of the Treasury Morgenthau for such a study as an approach to simplification of the national tax structure.

Proposed commission would be authorized to study and report to congress on "the influence of multiple taxation and reports required in connection therewith on business profits, policies and management," and the relationship between collection costs and revenue yield of taxes now in force.

Commission would include five nonpartisan members who would be recognized authorities on taxation or men especially qualified by background and experience. One member would represent the federal government, one the state governments, one business, and two the public.

Would Simplify Tax Structure

"I was impressed with Secretary Morgenthau's suggestion," Senator Barbour said, "and believe the bill will find favor both with senators on the finance committee and members of the house committee on ways and means. A study of double taxation was made by a subcommittee of the ways and means committee in 1933, and the division of research and statistics of the treasury department compiled an illuminating report in 1936 on collections from state-imposed taxes. These and other studies, including those of the national tax association, will be of great value to the commission, if the study which I have proposed should be authorized.

"It seems to me that the subject is sufficiently important to justify a more comprehensive study than any which has been made to date. The tax structure of the country, built on a hit-or-miss basis, has become involved in endless rivalry, confusion and complication. If we are to continue as a government of separate jurisdictions, as at present, there should at least be a tacit understanding between state and federal governments as to the fields each is to occupy in raising the revenue necessary for its own purposes, but before there can be any agreement on this score—if it is possible to work it out at all—there must be a clearer understanding all around of what taxes are being levied now, what they yield, and how much it costs to collect them.

"This, broadly, would be the principal purpose of the proposed study. The secondary purpose would be to learn definitely, to the extent that this can be done, just how multiple taxation is affecting business, and to what extent the annoyance of innumerable reports and investigations which now harass business executives actually constitutes an impediment to the flow of goods in commerce.

"To go on passing new tax laws and piling up the tax burden without knowing what other agencies of government have done and are doing, and without knowing the effect or value of the laws now in force, is little short of insane. I hope sincerely that congress will see the problem in the same light, and believe that in carrying out Secretary Morgenthau's suggestion we have an opportunity to perform a major service to the country."

HOUSE COMMITTEE MAY INVESTIGATE LABOR BOARD

Considerable dissension was created in the house last week when the rules committee approved a resolution providing for investigation of the national labor relations board by a special house committee. Action was taken over protests by membership of the house labor committee which has been holding extended hearings.

Representative Smith, Virginia, is author of the resolution and it is reported he has agreed to eliminate a provision empowering the investigating committee to recommend legislation.

Members of the house labor committee had strenuously objected to this inasmuch as they expect to recommend legislation themselves.

REQUIRE MORE DATA ON IMPORTED METAL PRODUCTS

Commissioner of Customs James H. Moyle has notified customs collectors of additional information which is to be required on invoices of certain imported articles "composed wholly or in chief value of metal."

In addition to present requirements, the additional information is to include the following: "The name of the metal which is in chief value; whether or not the article is plated; if the article is plated the name of the metal or metals with which the article is plated and the name of the metal or metals upon which the plating is plated." These metals include various items in the trade agreement with the United Kingdom including the catch-all provision of the agreement.

$510,000 APPROPRIATED FOR MONOPOLY INVESTIGATION

President Roosevelt last week signed the deficiency bill containing an appropriation for the use of the temporary national economic committee.

Approved bill provides a $510,000 appropriation for the present fiscal year, having been cut from $600,000 which the committee had asked. However, the committee had a balance in its fund as the fiscal year ended June 30, amounting to $80,000.

CHAMBER OF COMMERCE FIGHTS LEND-SPEND PLAN

Chamber of commerce of the United States is opposing the new lend-spend program of the administration and also the Mead bill which provides for government loans to small business.

Complicated character of some of

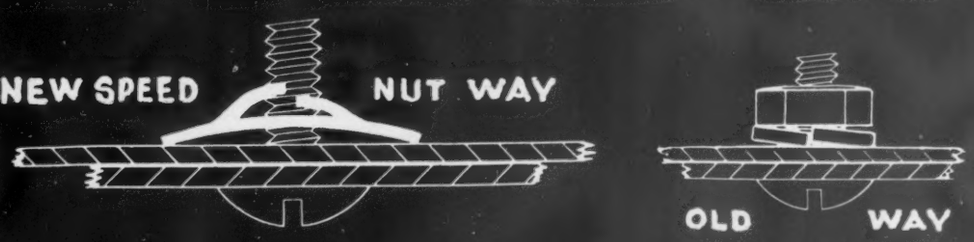
WHY WASTE

MATERIAL AND HANDLING TIME?

WHY HOLD NUTS WITH LOCKWASHERS?

USE *Speed Nuts*

THEY ELIMINATE LOCKWASHERS, CUT NUMBER OF PARTS IN HALF AND PRODUCE A BETTER SPRING TENSION ASSEMBLY



SPEED NUTS are manufactured from high carbon spring steel and heat treated to provide positive holding power for the life of the product. Made for most standard sizes of machine screws, stove bolts, metal screws, metal rivets and plastic studs. Many special shapes and sizes also developed for mass production products. Write for samples today, stating sizes desired and nature of application.

SPEED NUT DIVISION TINNERMAN STOVE & RANGE CO.
2039 FULTON ROAD, CLEVELAND, OHIO
Manufacturers of Patented SPEED NUTS

the proposals, says the chamber, will lead to much confusion. Before any action is taken to project the government further into the economic field, chamber spokesmen say adequate consideration should be given to such vital questions as:

Would a broad extension of government into the field of investment banking lead to state capitalism?

Would it mean that large-scale government spending and lending are to become permanent rather than emergency functions of the federal government?

Would it mean that states and municipalities are to surrender more of their independence in return for federal-guaranteed loans for public improvements?

Would the prospect of an increasingly government-dominated economy cause a further shrinkage in private investment, thereby more than offsetting any improvement that may result from further government lending?

How many of the loans would actually be self-liquidating and how many of them would be eventually charged against the taxpayers?

What is the limit to which the government's contingent liabilities—already $7,000,000,000—could be increased through the self-perpetuating character of the revolving funds that would be set up?

Would this temporarily painless process of pledging the national credit "without increasing debt or taxes" open the door for still more government lending agencies?

REGIONAL WAGES-HOURS OFFICES TO BE OPENED

Elmer F. Andrews, administrator, has announced establishment of 16 regions for the administration of the wages and hours law.

All offices will not be opened immediately because of budgetary limitations, Mr. Andrews said. He explained the purpose is to effect a limited decentralization of the act's administration.

Regional offices ultimately will be located in New York, (to cover New York and Connecticut), Boston, Philadelphia, Richmond, Va., Charlotte, N. C., Atlanta, Ga., Birmingham, Ala., Nashville, Tenn., Cleveland, Chicago, Minneapolis, Kansas City, Dallas, Tex., Denver, Seattle and San Francisco. Eleven branch offices also are planned.

"Through this new set-up and the limited decentralization to be put into effect gradually, beginning July 1, we will be able to speed up disposition of complaints and enforcement of the law," Mr. Andrews said. "The new plan will include adequate servicing of all regional offices with attorneys prepared to move promptly for court action to supplement our enforcement activities where this is indicated.

"The prosecution of criminal cases against willful and flagrant offenders under those sections of the fair labor standards act providing for fines up to $10,000 and imprisonment in certain cases will continue to be conducted by the department of justice, to whom such cases will be referred after our investigations based on complaints or routine inspections have been completed under the direction of the various regional directors.

"The regional directors in each instance, as the direct representative of the administrator, will be in entire control of all phases of the program of the wages and hours division within his region, including the co-operation and inspection, information and enforcement activities, pursuant to policies, regulations, interpretations and procedures approved by the administrator."

MEASURES STRESSES IN RIGID FRAME CONSTRUCTION

Computation of stresses in the component members of a rigid steel frame, heretofore a baffling problem to designers and engineers, is now possible, according to a report of the commerce department's bureau of standards.

This is of particular significance to the construction industry, since the rigid frame, a new type of construction, is now coming into extensive use in bridges, auditoriums, warehouses and airplane hangars where large unobstructed area are essential.

Designers have hesitated to employ rigid frames because no satisfactory method of computing the stresses in their component parts has been available.

High capacity testing machines have been developed in which even a large rigid frame can be subjected to full service loads. The bureau has also developed strain gages by which the actual stress in any member of a complex structure can be easily measured.

The bureau's investigation of stress distribution in steel frames was made in co-operation with the American Institute of Steel Construction.

FOREIGN COMMERCE OFFICERS NOW IN STATE DEPARTMENT

George Wythe, chief of the Latin-American section of the bureau of foreign and domestic commerce, has been appointed liaison officer between the departments of commerce and state. The new office was created following the shifting on July 1 of the foreign commerce officers of the commerce department to the state department under the President's reorganization plan.

Mr. Wythe's major responsibility will be in connection with the transmission of economic and business information received by the state department and which is to be distributed to industry by the department of commerce. Direction of the collection of business information abroad and the disseminating in this country of trade information will continue as a function of the department of commerce.

Administration officials contend that under the new arrangement American importers and exporters will have an expanded foreign service at their disposal. The plan is to have the bureau of foreign and domestic commerce act as the direct liaison between American business interests and the government as in the past. It is insisted by commerce department officials that that department will continue to formulate the program for trade promotion work and commercial reporting of officers in foreign lands. There is to be no change in the domestic activities of the bureau.

RAILWAY EQUIPMENT EXPORTS LOWER IN 1938

Upward trend of railway equipment exports from the United States since 1932 was halted in 1938 when sales abroad were valued at $21,576,952 compared with $25,375,514 in 1937, according to Thomas E. Lyons, chief of the transportation division, department of commerce.

Smaller foreign sales of railway track material due mainly to light construction programs in Latin America, was a major factor.

Notwithstanding conditions prevailing in many of those countries which adversely affected purchases, the Latin American region accounted for $10,262,064 of the total value of railway equipment exports.

Canada, with purchases valued at $3,877,740; Mexico, $2,736,936; Brazil, $2,359,008; Kwantung, $1,808,013; Chile, $1,430,547; and China, $1,346,812 were the principal buyers.

Foreign sales of steam railway locomotives valued at $3,261,489 were highest since 1929. Increased exports of locomotives was attributable in part to the assistance extended to American exporters during the year by the export-import bank.

Electric railway passenger car exports, valued at $1,221,971, were highest for the past several years, with Canada the principal market.

Steam railway freight cars, locomotive parts and accessories, railway car parts, car wheels and axles, steel rails, and railway ties were included among the principal classes of equipment sold abroad during the year.

Power Drives At World's Fair

NEW YORK

■ CENTRAL figure in Link-Belt Co.'s World's fair exhibit is the sculptured Spirit of Power Transmission. Holding a silent chain drive, the figure depicts the energizing of a great city of the future, symbolizes man-made progress through generation, transmission and control of power.

Exhibit, in the Metals building, is replete with photo murals, translites, dioramas, equipment and operating units in colorful settings. Upper background at both ends is occupied by large photo murals of heavy engineering installations: Conveyors and elevators for handling ore, coal, pulpwood, cement and sand; sewage and water treatment plants; excavating machinery; coal tipples and washing equipment; all using positive drives.

Conveying Systems Depicted

Thirty-one full-color illuminated translites are shown in the arcade. Subjects include: Automotive industry, belt conveyors, car movers and dumpers, baggage handling, car washing, farm implements, foundry materials handling, coal and ash handling equipment, coal preparation plants and operations, fisheries, fruit handling, conveyors for milk, stokers, cranes, shovels and draglines, oil drilling, meat handling, overhead conveyors preparing sand and gravel, steel mill conveyors, screening, salt handling, ice slingers, timing chain, vegetable and other mechanical handling equipment. Wherever possible, a full size sample of the chain employed is displayed beneath the translite. Many other forms of conveying equipment are shown in adjacent cases and may be identified readily from the translites.

Eleven scale dioramas approximate actual installation conditions for coal washing equipment, sugar mill cane handling, power plant coal handling, oil well drilling, sand and gravel preparation, stokers, excavating equipment, mud screen for oil fields, concrete mixing, saw mill conveyors and a Roto-Louvre dryer.

Show Accessory Equipment

Equipment shown necessarily is limited to the smaller items or to portions of the larger full size construction. Beneath the sculptured figure is displayed a motorized P. I. V. positive variable speed transmission in operation, driving a worm gear speed reducer. Visitors may change the ratios of the drive and thus better understand its operation. Nearby is another motorized P. I. V. driving through a herringbone reducer to a disk. Alongside turns a duplicate disk. Guests are invited to synchronize the speeds of both disks. Neon stroboscope lighting indicates when perfect synchronization has been obtained.

Various types and arrangements of silent chain and roller chain drives are in operation. Nearby is a case containing typical samples of these chains, from the smallest to the largest. Also in this case is an operating conveyor made of two-plane bend Universal Carrier chain with typical chain attachments fastened to the top chain plates.

Other displays include anti-friction bearings, clutches, screw conveyor equipment, sprockets, buckets, belt conveyor idlers, gears, pulleys, take-ups, apron and flight conveyors, traveling intake water screen, an operating model of a pivoted bucket carrier and full size sections of 1,000,000-pound ultimate strength dam chain.

Participation in the fair is part of the company's program designed to familiarize the public with the true story of what machinery means to America, how machinery makes possible the production of more and better goods for more people at lower cost.

At intervals, five two-minute transcribed talks devoted to industry and its accomplishments are broadcast through amplifiers. Synchronized with the talks are a sequence of illuminated translites in natural color which automatically move into a panel under the sculptured figure. They include a scene of city life 60 years ago, an American youth in his basement workshop, an American family on a picnic, an airplane view of lower New York and the fair grounds.

■ **This sculptured figure, representing the Spirit of Power Transmission, symbolizes man's progress through generation, transmission and control of power. It is the central figure in Link-Belt Co.'s exhibit at New York World's fair**

Outlines Activities Of Steel Institute

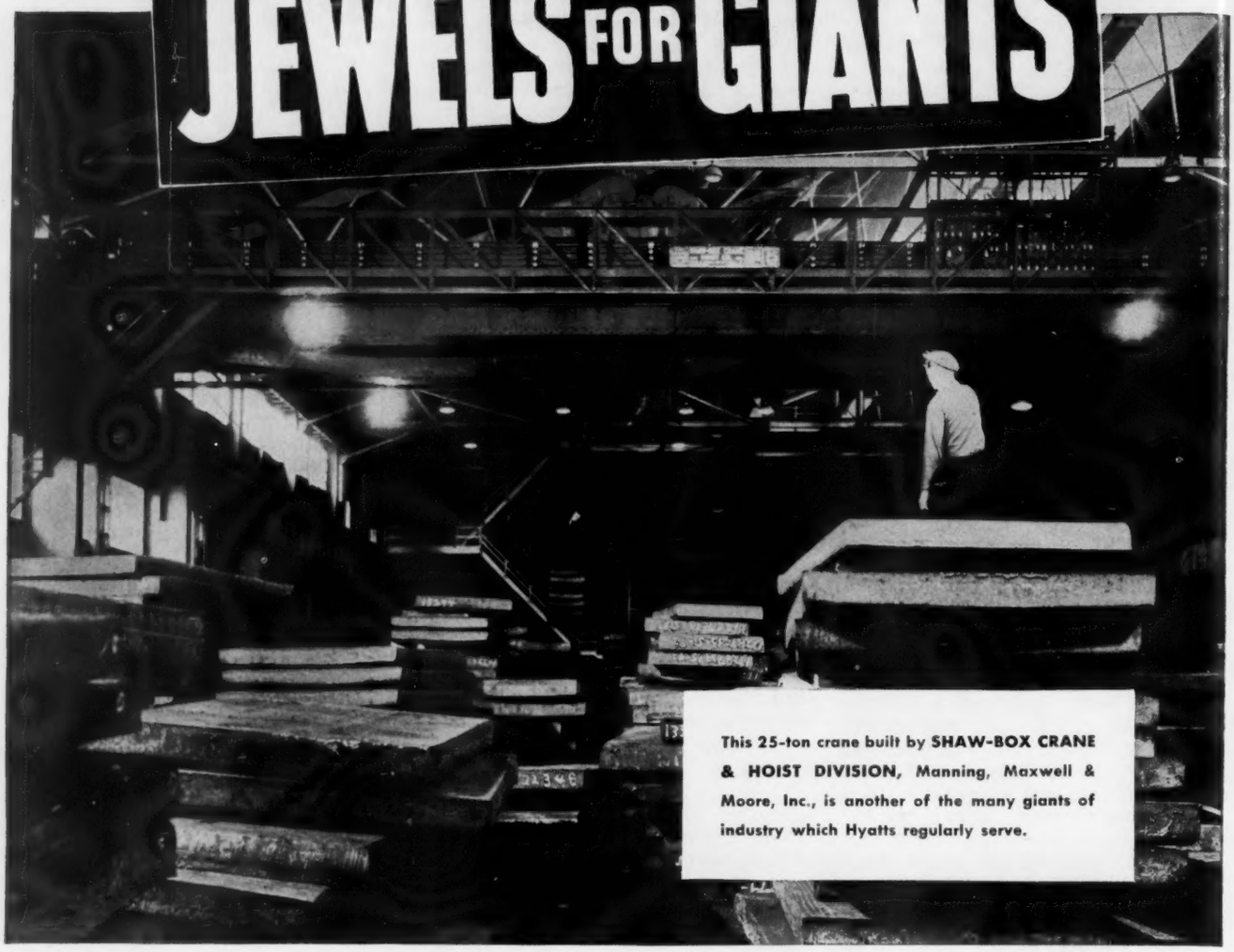
■ Activities of American Iron and Steel institute are described by Walter S. Tower, executive secretary, in a pamphlet just published. Booklet briefly sketches the institute's organization and reports in some detail concerning its recent accomplishments.

Much of the institute's work, the pamphlet points out, is along lines formulated by standing or special committees. These include committees on statistics, tariffs, industrial relations, traffic, technical questions, manufacturing problems, building codes, stream pollution problems, and publications.

Routine activities of the staff also are mentioned. Many inquiries for information are received and it is the institute's policy to answer, if it can, any question relating to the steel industry. Mr. Tower declares that despite the wide range of activities now carried on in the general interest of the iron and steel industry there is much room for further helpful co-operation, both in lines already started and in new lines still to be tried.

■ Production of malleable iron castings in May was 30,840 net tons, 800 tons under 31,640 tons in April. Output in May, 1938, was 17,097 tons and in May, 1937, 55,960 tons, according to the bureau of the census. For five months this year aggregate production was 172,253 tons, almost double 95,825 tons in the same period in 1938.

JEWELS FOR GIANTS

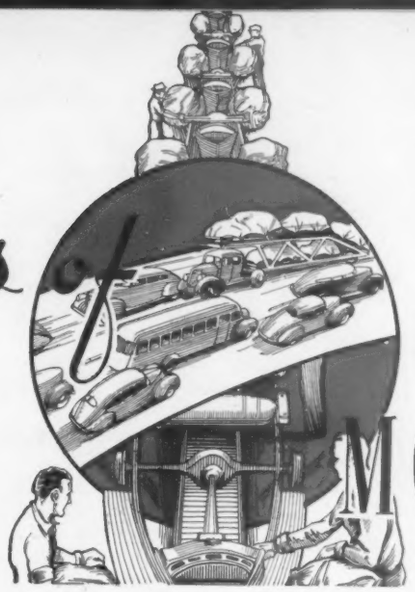


This 25-ton crane built by **SHAW-BOX CRANE & HOIST DIVISION,** Manning, Maxwell & Moore, Inc., is another of the many giants of industry which Hyatts regularly serve.

That's just what they are—these dependable Hyatt Roller Bearings—jewels for the giants of industry. On them and around them turn the shafts, gears, and wheels which operate mechanical equipment in mill and factory, on railways and highways. Like a fully jewelled watch movement, "fully Hyatt equipped" is synonymous with better performance, greater economy and longer life. What about your equipment? Hyatt Bearings Division, General Motors Sales Corporation, Harrison, N. J., Chicago, Pittsburgh, Detroit and San Francisco.

HYATT *Roller* BEARINGS

Mirrors of MOTORDOM



By A. H. ALLEN
Detroit Editor, STEEL

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DETROIT

■ PREVIEW of the new Ford tractor (STEEL, July 3, p. 19) was staged impressively and may well go down in history as the epochal event its sponsors calculated it to be. Certainly the tractor seems to embody about everything a farmer could wish for in the mechanization of his operations, and although the price—$585 without implements—may not be as low as some of the other low-price tractors being introduced by implement builders this year, the margin by which the Ford unit will outperform and outmaneuver the competition may prove to be the key to its eventual success.

It is said that in every case where one of the Ferguson tractors was purchased by British farm operators, repeat orders were received if the farm was large enough to justify additional equipment. And the price there was over twice what is being asked for the American design.

Photographers Busy

At the occasion of the preview on the estate of Mr. Henry Ford, guests were handed a handsome souvenir booklet titled *Invitation to the Land*, replete with pictures of the tractor in operation, and written with all the solemnity and auspiciousness which should accompany a development aimed to "revolutionize agriculture all over the world."

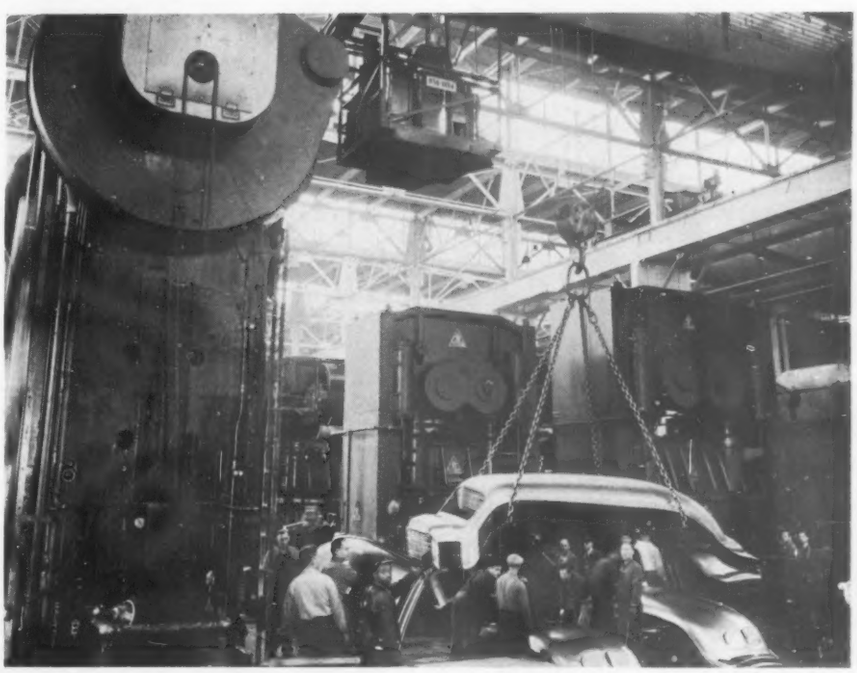
An introductory paragraph is significant: "The door is open now for the next great industrial movement—the decentralization of sorely congested manufacturing centers and a return to the land for millions of families who never would have left it. The migration of industry to rural and suburban areas will bring economic stabilization to the nation and to the individual. It will be easily possible—using this new machinery which a 12-year old boy can safely operate—for a worker to combine industry and agriculture. He can work in industry and run a small mechanized farm as well, without impairing his efficiency as an industrial worker. With one foot on the land—and one in industry—America is safe."

The book would make a valuable addition to anyone's library and copies should be available upon written request to Ford Motor Co.

There were nearly as many cameras as visitors at the showing, and certainly the demonstration was indelibly recorded on a thousand photographic films for both public and private consumption. Most in evidence was a photographer from *Life* magazine who was literally hung with various types of cameras and who seemed to be everywhere at once, from the bottom of a freshly turned furrow to within a few inches of the radiator grille of a tractor as it lumbered by.

To one side of the grandstand

Stamping One-Piece Steel Sedan Tops



■ **Nine miles of steel an hour, in strip 72 inches wide, moves through these presses which form one-piece steel tops for Plymouth sedans. Largest individual piece in the modern automobile, the stampings are formed in an unbroken section all the way from the trunk to the cowl. Pressures up to 1500 tons are required in the heavier equipment**

erected to accommodate visitors during the demonstration was parked a black Ford V-8 which outwardly looked just about like the other cars parked on the grounds. Only a few of the 500 persons present stopped to inspect it carefully, but shortly before the demonstration a small group gathered around it in company with Henry and Edsel Ford to inspect a rear trunk lid or door made of soybean plastic. This door is about 36 inches wide and possibly not quite so deep, shaped with the proper curvature to conform with the body contour.

Underneath, it is reinforced with a steel X-member and the outside is finished with lustrous black enamel, closely if not exactly matching the finish of the car itself. The door carries the conventional hardware and is mounted with hinges at the top just as the regular doors are. Mr. Ford indicated such equipment would be placed on "a few cars" for next year, marking the first application of plastics to outside body panels, which may be another epoch-making development.

Sees "Profit in Weeds"

It is well known, of course, that Ford has been experimenting with plastics for automotive construction. Glove compartment doors were one of the first applications. Reports were heard that fenders and doors had been produced successfully. However, this trunk door appears to have taken precedence over the other parts for the time being. Made of steel, it is a difficult stamping job, because of the large radius of curvature and the slight amount of draw involved. Of steel-reinforced plastic, a better and quieter fit can be made.

Whether the door will stand up against severe weather conditions and whether the finish will adhere rigidly for long periods of time remain to be seen. The plastic is of the laminated type, several layers of canvas being impregnated with the plastic powder and then pressed to shape under heat.

Commenting upon the subject of synthetics generally and the use of products of the land in automobiles, Mr. Ford said he foresaw the day when farmers would be able to make a profit out of the weeds growing on their land. He pointed to the driver's seat on the tractor and explained it was made of grass fibers, pressed to shape with suitable bonding material.

■ DETERMINED to show its strength at any cost, the UAW-CIO began calling its tool, die, engineering and maintenance workmen in General Motors' plants out on strike last week. By Thursday 3700 workers were idle following walkouts at four plants in Detroit and one in Pontiac. Units affected were three Fisher body plants and two divisions of Chevrolet gear and axle.

Picket lines were established and unionists permitted only office help and power house employes to pass through upon showing passes. Spreading of the strike to the Ternstedt and Fleetwood divisions was considered likely.

Workmen employed in 1939 models were not affected but the corporation spokesmen indicated they will be if the strike lasts mre than a week. Labor Concilator Dewey was dispatched to Detroit to attempt to arrange conferences between the union and management.

Official demands made by the union include: All parts produced in these plants to carry a union label, which will mean that UAW employes in all other divisions would refuse to work with any tools and dies not carrying such labels; uniform minimum hiring rate; wage increases of at least 10 cents an hour; overtime provisions, and standard apprentice plan.

With 1940 model production scheduled to begin in a week or so in some GM plants, this walkout of toolmakers and diemakers may have serious consequence on production plans. It is known extra pressure has been given to certain die programs to circumvent the present labor trouble, but whether it has been possible to clear through all these rush jobs is doubtful.

The corporation has taken the stand it cannot negotiate with either the CIO or AFL division of the auto workers' union until the courts have made their status clear. Meanwhile the management has petitioned the national labor board to assume jurisdiction in determining which group represents employes. To the disinterested observer, it appears the CIO has by far the upper hand in control of the men involved.

Strike votes which unions profess to take in these disputes are said to be farcical affairs with many of the aspects of "Hitler elections." They usually involve distribution of printed slips which read: "YES, I am in favor of striking." These are passed out to all the men who then deposit them in ballot boxes without even the formality of putting a mark on them. The ballots then are collected and the ratio of the number received to the number distributed is the tabulation of the "strike vote."

Behind this disturbance among tool and die men in GM plants, some analysts see nothing more than an attempt to hold up the corporation's new model work to the same degree the Briggs tool and die divisions were held up on 1940 Chrysler models, or a little over two weeks. Naturally, it would be difficult to prove this, but there are many logical aspects to such a view. Should this be the case, then look for an adjustment of the current difficulty by the end of the month.

New agreement covering all its plants has been signed by Doehler Die Casting Co. of Toledo, O., and the National Association of Die Casting Workers, following friendly negotiations. A minimum hourly wage of 60 cents for production employes and vacation bonus is included.

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1937	1938	1939
Jan.	399,186	227,130	353,946
Feb.	383,900	202,589	312,141
March	519,022	238,598	389,489
April	553,231	238,133	354,263
May	540,377	210,183	313,214
June	521,153	189,399	*308,281
6 mos.	2,916,869	1,306,057	2,031,334
July	456,909	150,444	.....
Aug.	405,072	96,936	.....
Sept.	175,630	89,623	.....
Oct.	337,979	215,296	.....
Nov.	376,629	390,350	.....
Dec.	347,349	407,016	.....
Year	5,016,437	2,655,777	.....

*Estimated.

Estimated by *Ward's Reports*

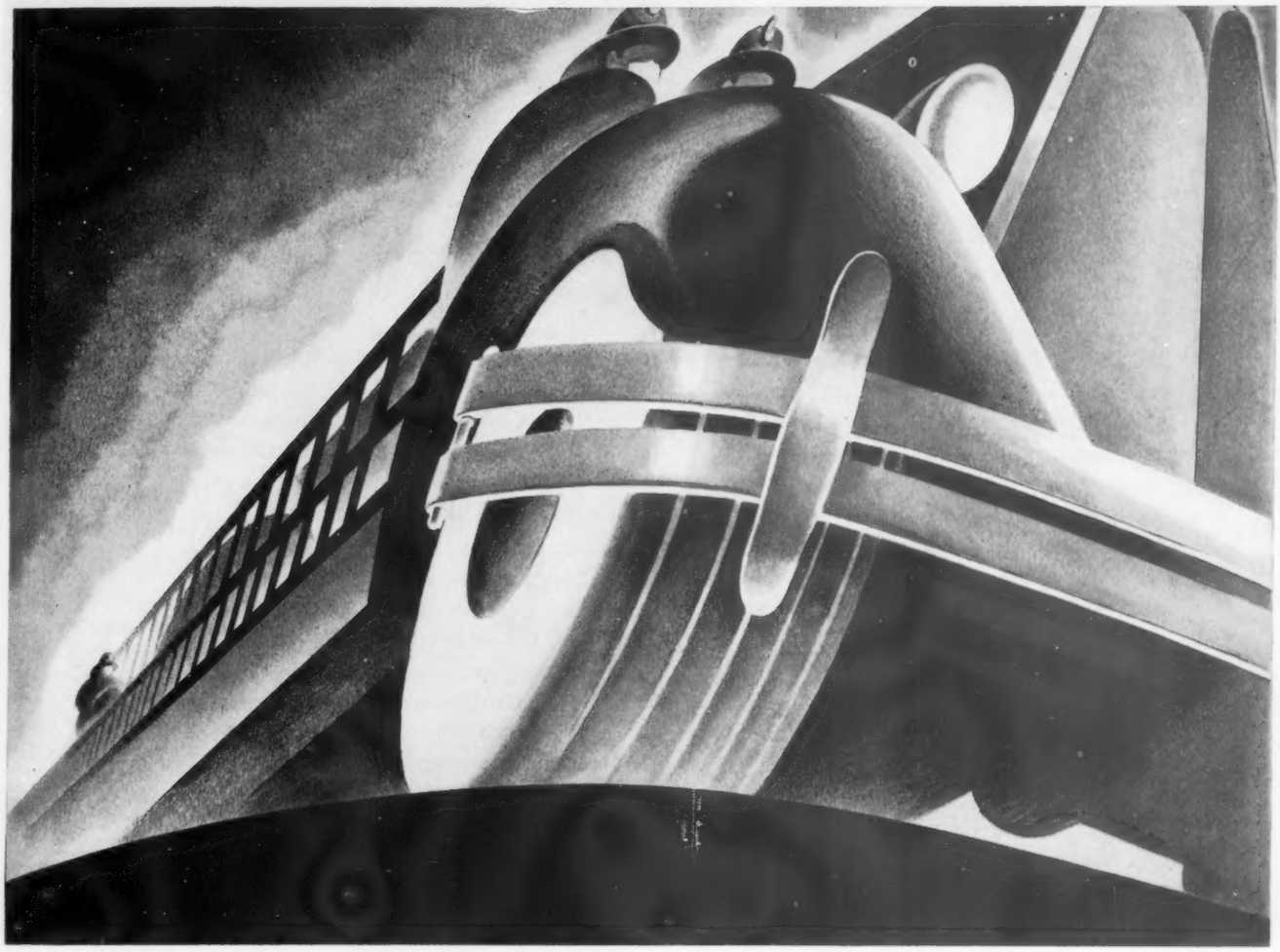
Week ended:	1939	1938†
June 10	65,265	40,175
June 17	78,305	41,790
June 24	81,070	40,918
July 1	70,663	40,945
July 8	42,784	25,375

†Comparable week.

	Week Ended	
	July 8	July 1
General Motors	13,775	22,873
Chrysler	13,980	21,810
Ford	10,800	19,600
All others	4,229	6,380

■ LOCK washer with a V cross section instead of the former design in which surfaces were parallel is being used by Cadillac-La Salle. Failures of the old design were infrequent, not exceeding 0.005 per cent, but even so engineers set about to eliminate them. What spreading or splitting of washers had been encountered previously was attributed to the use of high-cycle wrenches, turning up 2000-3000 revolutions per minute, which drew up nuts and bolts with considerable jar. O. J. Snider, chief of inspection, and L. A. Danse, metallurgist, began looking into the problem for Cadillac several months ago. Recalling the severe test which use in railroad track assemblies gives to lock

(*Please turn to Page* 78)



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Furthermore, the uniform response of this steel to heat treatment assures the consistent qualities essential in volume production, while its comparative inexpensiveness and ready machineability in the heat treated condition keep costs down.

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Editorial

Automobiles and the Price of Steel

■ FOR MANY years the automobile industry has been regarded by its suppliers as a hard taskmaster. Doubtless this is deserved, not so much because automotive buyers necessarily expect more of their suppliers than those in any other industry, but because the automotive industry, through the concentration of production in so few companies, and because of the huge volume of purchases of these companies, is in a better than usual position to dictate terms on which it is willing to do business.

Not because the automotive industry is any more eager than any other industry to buy its materials at the most favorable prices, but because the sheer weight of its requirements is compelling upon order-hungry companies, did the buying by that industry in the recent "orgy of competition" help to influence prices to levels which (STEEL, June 26, p. 15) will result in losses of many millions to the steel industry.

Is the Automobile Industry Following Statesmanlike Course with Suppliers?

The steel industry does not blame the automotive industry for its disastrous price-slashing policies. This possibly is only natural since steel not only hesitates to criticize its best customer, but realizes that the supplier is in no position to blame the customer when he sells his goods at an unprofitable price.

Under conditions when there is a sharp dearth of tonnage to satisfy the huge appetites of the modern continuous mills, however, no company saddled with the high overhead of such a mill dares to risk loss of its share of the going business. Some of them, driven by overhead, occasionally are tempted to try for more than their share of the going business. The result is a jittery condition that plays right into the hands of the tonnage consumers. And among these the largest are the automotive consumers.

For some time past the automobile industry has been confronted with serious labor problems. It has devoted a great deal of study to its industrial and public relations. It now seems pertinent to raise the question: "Is the automobile industry pursuing a statesmanlike course in its relations with its supplier industries?"

It recently was pointed out (STEEL, March 13, p. 23) that the leading automotive interest in the 6-year period, 1933-1938, paid out $14.75 in dividends on common stock while during that period the leading steelmaker paid out $1 in similar dividends. It also was pointed out that the current book value on this particular automotive stock was $17.90 while that of the particular steel company was $151.09.

Depression in Steel's Domain Does not Stimulate Sale of Automobiles

This comparison shows conclusively that the automotive industry is a much better merchandiser than the steel industry. But the comparison has further implications. It would be better for both if the comparison were less one-sided. It would be better for both if steel made a good profit, as well as the automobile. For a condition in which steel is depressed leads not only to widespread reduction of individual purchasing power among steel employes and stockholders, but it affects the purchasing power of huge numbers of workers who produce so-called capital goods of greatly diversified character which the steel companies buy in huge volume under normal conditions, as a part of their constant fight against obsolescence and high costs.

This situation is one which the automobile industry well may study. For a depressed condition in the steel industry and in the many industries that live in whole or in part on steel is not one to increase the sale of automobiles. And a difference of a few dollars in the price of steel means a depressed condition in the domain of steel without exerting an appreciable bearing on the cost per car.

The BUSINESS TREND

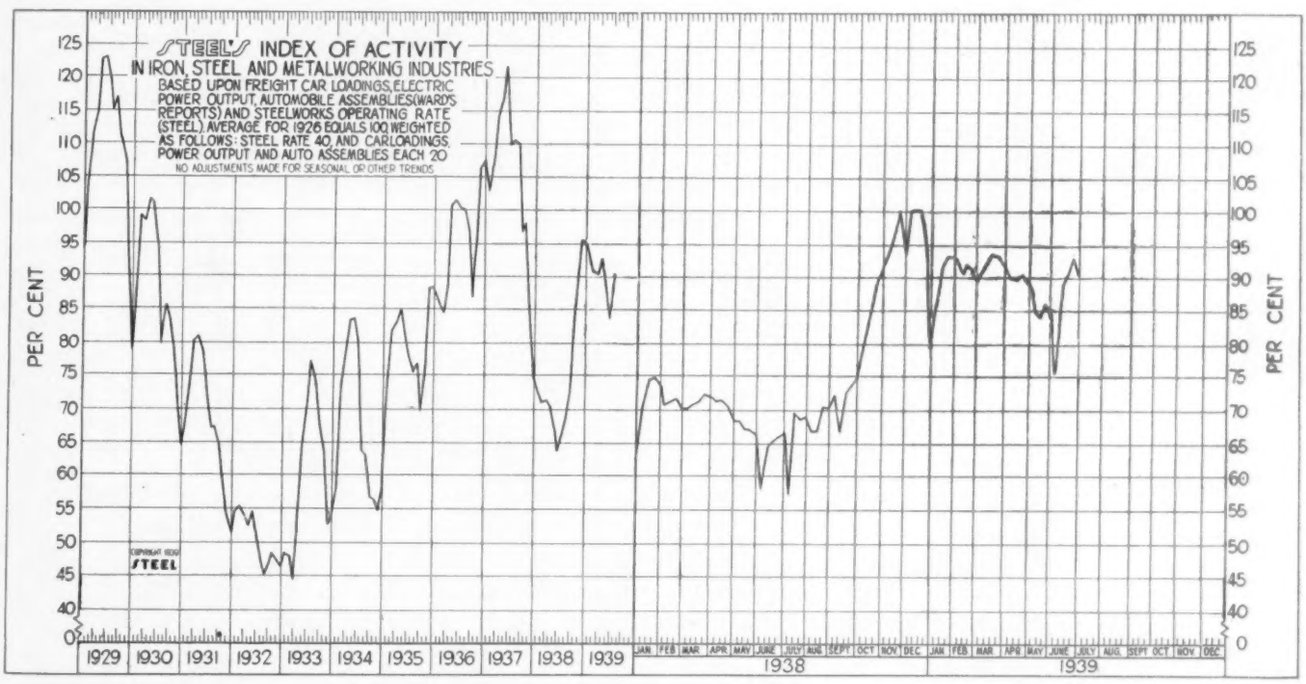
Index Reflects Encouraging Improvement During June

■ THE encouraging improvement in industrial activity throughout June is illustrated by STEEL's monthly index, which reversed the downward movement recorded during May to closely approach the March level. The monthly index figure for June was 90.5, up sharply from the 83.4 level registered in May. It compares favorably with the index figure of 92.6 recorded in March. In June last year the index stood at 63.4.

The bituminous coal strike during May, and to a lesser degree the effect that the strike at Briggs had on automobile production during the same period, were important factors in accentuating the general improvement in industrial activity in June.

The expected decline in automobile assemblies in the week ended July 1, forced STEEL's weekly index to ease 2.2 points to 90.8. A further decline is expected to be recorded by the index during the week ended July 8, reflecting the July 4 holiday interruption.

Initial step in the seasonal downtrend in automobile assemblies was witnessed during the week ended July 1. The weeks total production came to 70,663, compared with 81,070 in the preceding week and 43,945 in the corresponding week last year. General motors accounted for a sizeable proportion of the current decline, while the Ford plants alone held steady. Early estimates of retail deliv-


STEEL'S INDEX OF ACTIVITY
IN IRON, STEEL AND METALWORKING INDUSTRIES
BASED UPON FREIGHT CAR LOADINGS, ELECTRIC POWER OUTPUT, AUTOMOBILE ASSEMBLIES (WARD'S REPORTS) AND STEELWORKS OPERATING RATE (STEEL). AVERAGE FOR 1926 EQUALS 100. WEIGHTED AS FOLLOWS: STEEL RATE 40, AND CARLOADINGS, POWER OUTPUT AND AUTO ASSEMBLIES EACH 20
NO ADJUSTMENTS MADE FOR SEASONAL OR OTHER TRENDS
PER CENT
1929 1930 1931 1932 1933 1934 1935 1936 1937 1938 1939
1938
1939

STEEL'S index of activity declined 2.2 points to 90.8 in the week ended July 1:

Week ending	1939	1938
April 15	89.7	71.4
April 22	90.4	70.8
April 29	89.2	68.4
May 6	85.1	68.5
May 13	84.2	67.2
May 20	86.6	67.1
May 27	85.4	66.5
June 3	75.9	58.1
June 10	88.2	64.4
June 17	90.9	65.2
June 24	93.0	66.0
July 1	90.8†	66.5

Mo. Data	1939	1938	1937	1936	1935	1934	1933	1932	1931	1930	1929
Jan.	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6	69.1	87.6	104.1
Feb.	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3	75.5	99.2	111.2
March	92.6	71.2	114.4	88.7	83.1	78.9	44.5	54.2	80.4	98.6	114.0
April	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.8	81.0	101.7	122.5
May	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8	78.6	101.2	122.9
June	90.5	63.4	109.9	100.3	77.4	80.6	70.3	51.4	72.1	95.8	120.3
July	....	66.2	110.4	100.1	75.3	63.7	77.1	47.1	67.3	79.9	115.2
Aug.	....	68.7	110.0	97.1	76.7	63.0	74.1	45.0	67.4	85.4	116.9
Sept.	....	72.5	96.8	86.7	69.7	56.9	68.0	46.5	64.3	83.7	110.8
Oct.	....	83.6	98.1	94.8	77.0	56.4	63.1	48.4	59.2	78.8	107.1
Nov.	....	95.9	84.1	106.4	88.1	54.9	52.8	47.5	54.4	71.0	92.2
Dec.	....	95.1	74.7	107.6	88.2	58.9	54.0	46.2	51.3	64.3	78.3

†Preliminary.

eries in the final 10 days of June indicate that there was a sharp recovery, and total sales for the month are not likely to run far below 300,000 units, compared with 313,214 in May. Motor car production during June is estimated at approximately 310,000 units, a gain of 63.7 per cent over the 189,402 units assembled in the corresponding month last year.

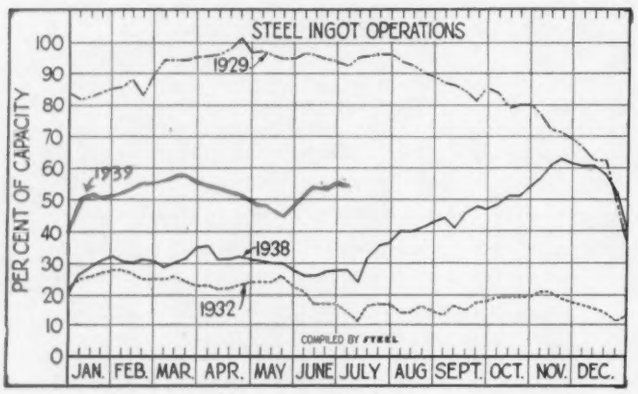
Steelmaking operations eased a half point to 54.0 per cent during the week ended July 1, but remained well above the 28.0 per cent level recorded in the same week last year. Comparisons with a year ago will not be so favorable through the remainder of the summer months, for it will be recalled that at approximately this time last year the national steel rate started the steady upward movement which lasted until a mild reaction set in about the middle of November. Following the decline resulting from the Fourth of July holiday interruption, steelworks operations will likely level off at approximately the 55 per cent level until the automotive suppliers and builders issue releases against steel already contracted for the 1940 models.

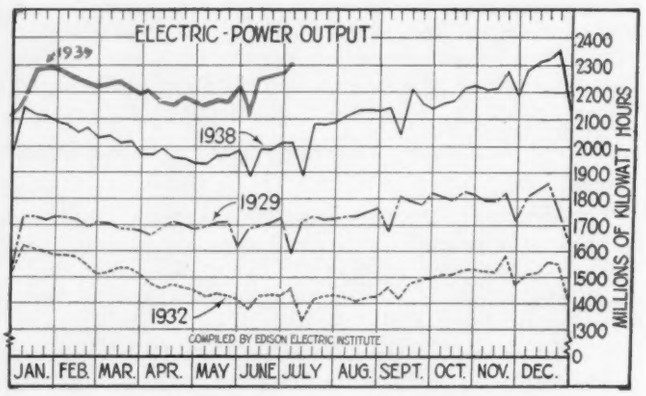
Encouraging gains were recorded by revenue freight carloadings and electric power consumption during the week ended July 1. Both these industrial indicators touched new highs for the year to date.

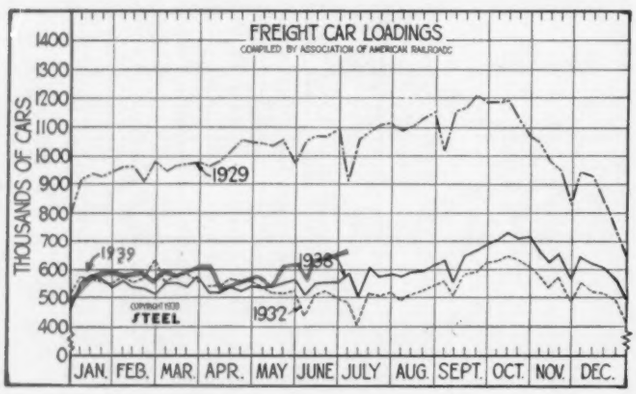
VOLUME OF FOREIGN TRADE INCREASES

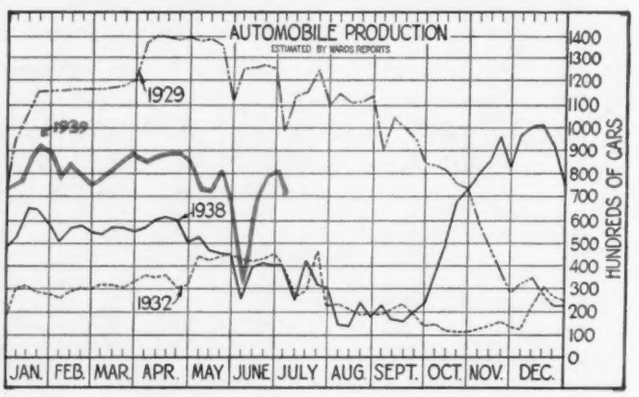
Foreign Trade reached a fairly high level during May. Imports had a greater dollar value than any month since December, 1937, and allowing for seasonal variation exports were as high as, or higher than, any month this year. Exports totaled $249,259,000 in May, against $230,948,000 in April but was below the $257,276,000 export total in May, 1938. Imports during May of $202,502,000 not only exceeded the April total of $186,195,000 but also topped the May, 1938, import total of $148,248,000. The balance of trade in each of these months on the export side amounted to $46,757,000 in May, $44,753,000 in April and $109,028,000 in May a year ago.

Following the general trend exports of iron and steel products during May rose to the highest level since May, 1938. However, imports in May were off from the April volume. May exports totaled 532,641 tons, compared with 394,008 in April and 540,639 in May, 1938. Imports receded from 44,083 tons in April to 28,142 in May, but exceeded the import volume of 20,814 tons in May last year.



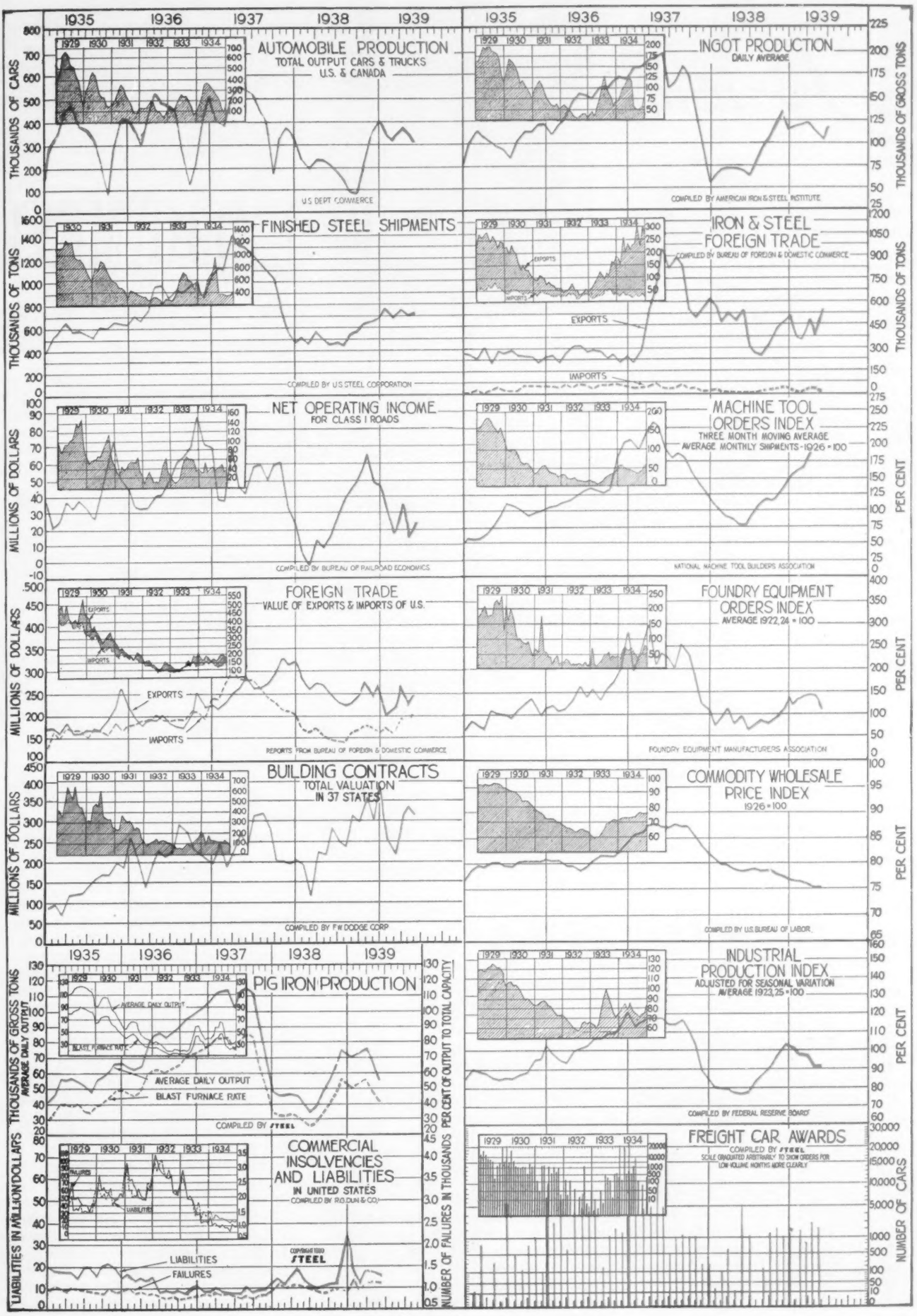




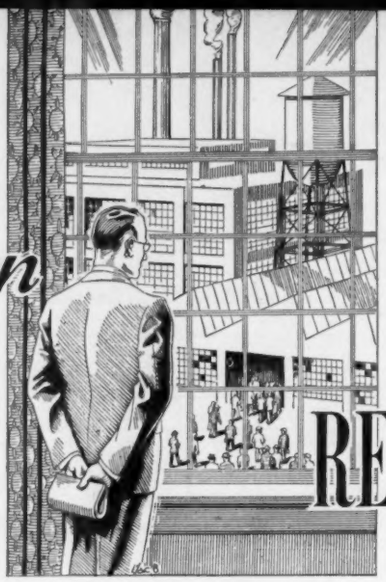


Week ending	Steelworks Operating Rate Per Cent 1939	1938	1932	1929	Electric Power Output Million KWH 1939	1938	1932	Freight Car Loadings Thousands of Cars 1929	1939	1938	1932	1929	Weekly Auto Output 1939	1938	1932	1929
Mar. 25	55.5	35.0	23.0	94.5	2,199	1,975	1,514	1,683	605	573	561	961	89,400	56,800	32,892	117,500
Apr. 1	54.5	36.0	23.0	95.0	1,210	1,979	1,480	1,680	604	523	545	967	85,980	57,500	35,756	120,000
Apr. 8	53.5	32.0	22.0	95.5	2,173	1,990	1,465	1,663	535	522	545	956	87,019	60,975	35,390	138,417
Apr. 15	51.5	32.0	22.0	96.0	2,171	1,958	1,480	1,697	548	538	567	972	88,050	62,021	35,778	140,822
Apr. 22	50.5	32.5	23.0	98.0	2,199	1,951	1,469	1,709	559	524	562	1,004	90,280	60,563	30,672	140,290
Apr. 29	49.0	32.0	24.0	101.0	2,183	1,939	1,445	1,700	586	543	554	1,052	86,640	50,755	31,121	139,732
May 6	49.0	31.0	24.0	97.0	2,164	1,939	1,429	1,688	573	536	534	1,050	71,420	53,385	43,899	140,672
May 13	47.0	30.0	24.0	97.0	2,171	1,968	1,436	1,698	555	542	517	1,048	72,375	47,415	42,587	138,541
May 20	45.5	30.0	25.5	96.0	2,170	1,968	1,435	1,704	616	546	516	1,046	80,145	46,810	43,470	139,528
May 27	48.0	28.5	23.0	95.0	2,205	1,973	1,425	1,705	628	562	521	1,061	67,740	45,120	45,121	136,032
June 3	52.0	25.5	21.0	95.0	2,114	1,879	1,381	1,615	568	503	447	972	32,445	26,980	44,116	111,372
June 10	53.5	25.5	17.0	96.5	2,257	1,992	1,435	1,690	635	554	502	1,055	65,265	40,175	43,491	125,307
June 17	52.5	27.0	17.0	96.0	2,265	1,991	1,441	1,699	638	556	518	1,069	78,305	41,790	44,121	126,125
June 24	54.5	28.0	17.0	94.0	2,285	2,019	1,440	1,723	643	559	499	1,096	81,070	40,918	45,110	125,736
July 1	54.0	28.0	14.5	93.0	2,300	2,015	1,456	1,592	657†	559	480	909	70,663	40,945	40,291	98,746

†Preliminary.


1935 1936 1937 1938 1939
AUTOMOBILE PRODUCTION
TOTAL OUTPUT CARS & TRUCKS U.S. & CANADA
THOUSANDS OF CARS
U.S. DEPT. COMMERCE
INGOT PRODUCTION
DAILY AVERAGE
THOUSANDS OF GROSS TONS
COMPILED BY AMERICAN IRON & STEEL INSTITUTE
FINISHED STEEL SHIPMENTS
THOUSANDS OF TONS
COMPILED BY U.S. STEEL CORPORATION
IRON & STEEL FOREIGN TRADE
COMPILED BY BUREAU OF FOREIGN & DOMESTIC COMMERCE
EXPORTS
IMPORTS
THOUSANDS OF TONS
NET OPERATING INCOME
FOR CLASS I ROADS
MILLIONS OF DOLLARS
COMPILED BY BUREAU OF RAILROAD ECONOMICS
MACHINE TOOL ORDERS INDEX
THREE MONTH MOVING AVERAGE
AVERAGE MONTHLY SHIPMENTS - 1926 = 100
PER CENT
NATIONAL MACHINE TOOL BUILDERS ASSOCIATION
FOREIGN TRADE
VALUE OF EXPORTS & IMPORTS OF U.S.
EXPORTS
IMPORTS
MILLIONS OF DOLLARS
REPORTS FROM BUREAU OF FOREIGN & DOMESTIC COMMERCE
FOUNDRY EQUIPMENT ORDERS INDEX
AVERAGE 1922,24 = 100
PER CENT
FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION
BUILDING CONTRACTS
TOTAL VALUATION IN 37 STATES
MILLIONS OF DOLLARS
COMPILED BY F.W. DODGE CORP.
COMMODITY WHOLESALE PRICE INDEX
1926 = 100
PER CENT
COMPILED BY U.S. BUREAU OF LABOR
1935 1936 1937 1938 1939
PIG IRON PRODUCTION
AVERAGE DAILY OUTPUT
BLAST FURNACE RATE
THOUSANDS OF GROSS TONS AVERAGE DAILY OUTPUT
PER CENT OF OUTPUT TO TOTAL CAPACITY
COMPILED BY STEEL
INDUSTRIAL PRODUCTION INDEX
ADJUSTED FOR SEASONAL VARIATION
AVERAGE 1923,25 = 100
PER CENT
COMPILED BY FEDERAL RESERVE BOARD
COMMERCIAL INSOLVENCIES AND LIABILITIES
IN UNITED STATES
COMPILED BY R.G. DUN & CO.
LIABILITIES
FAILURES
LIABILITIES IN MILLION DOLLARS
NUMBER OF FAILURES IN THOUSANDS
COPYRIGHT 1939 STEEL
FREIGHT CAR AWARDS
COMPILED BY STEEL
SCALE GRADUATED ARBITRARILY TO SHOW ORDERS FOR LOW-VOLUME MONTHS MORE CLEARLY
NUMBER OF CARS

Forum on RE-EMPLOYMENT



■ Ralph E. Flanders of Springfield, Vt., president of Jones & Lamson Machine Co. and of Bryant Chucking Grinder Co., for at least 30 years has been widely known as a mechanical engineer and as one of the leading figures in the machine tool industry. Within more recent years he has earned still further national recognition as an economist. It is in the latter role that he is presented in this week's Forum.

Mr. Flanders was born in Barnet, Vt., in 1880. Following graduation from Central Falls, R. I., high school, he learned the machinist's trade as an apprentice at Brown & Sharpe Mfg. Co. This was the foundation for a career which led to the presidencies of the National Machine Tool Builders' association (1923) and of the American Society of Mechanical Engineers (1934), and to honorary degrees from a number of colleges and universities—including Stevens Institute and Dartmouth.

As a strong advocate of sound economic principles in government affairs, Mr. Flanders has participated in "America's Town Meeting of the Air," the radio feature sponsored by Town Hall, New York, in co-operation with National Broadcasting Co. A transcription of his broadcast, "How Can We Put the Unemployed Back to Work?", as published by Columbia University Press, appears herewith.

Among other things he proposes a new institution, "—organized governmental employment, expanded and contracted on the basis of a flexible budget, which is itself unbalanced on the side of expenditure during periods of low employment, unbalanced on the side of debt retirement during periods of prosperity, but kept in full balance over the full cycle."

In further reference to this, Mr. Flanders writes to us as follows: "If anything, I should like to emphasize even more strongly my belief that a 'flexible budget,' based on the unemployment index, can only be successfully applied by an administration which is able to balance the budget under normal business conditions—and actually does so."

—The Editors

■ If one brilliant stroke of policy or the application of a single magic formula would put the unemployed back to work, the secret might be clearly revealed in my alloted space. There is no single brilliant policy and no magic formula. I am, therefore, compelled to give, in outline only, a description of a group of attitudes which lead toward the desired solution.

The first requirement for putting men back to work is a change of front on the part of government. The conflict over the TVA now seems to be drawing to a close, but not until it has done incalculable damage. It has been the symbol of the destructive attitude of government toward business enterprise, and of its determination to maintain this attitude whatever the cost to the nation in unemployment.

Originally the TVA was an appealing experiment in raising the living standard of the Tennessee valley by better use of the natural resources of the region. Fortunately this experiment has not been abandoned. But for years the major public activity was a campaign against utility rates and utility investments.

It was not so much the simple endeavor to obtain lower rates that made this campaign disastrous to recovery. It was the recklessness and insincerity of that campaign. In this instance by visible and indubitable evidence of hostility, and in all other business relations by piecemeal revelation and broader valid inference of hostility or ignorance, new business investment has been stopped, private re-employment has ceased, and the individual worker has been the ultimate victim.

Investments Overdue

To put the matter in terms of re-employment, more than $1,000,000,000 of new investment and re-employment is overdue in the utility field alone. To speak in terms of the individual citizen's personal interest, the most that the government could ever do is to save him $30 to $40 per year on his household electric bill. This is indeed a sum worth saving, but is it adequate recompense for years of unemployment and billions spent for relief? The ends sought are not philantropic but political. And the harmful results are far wider than the utilities

problem. They cover the whole area of business enterprise.

We may hope for a change of heart by the administration in this respect, but in any event there is hope in congress. That body has it in its power to recast the relationships of government and business, and on its own initiative lead to a revival of business enterprise and re-employment. The principle by which it must test existing and proposed legislation is this. Does each separate act tend toward the expansion of employment and consumption? If so, the legislation is *prima facie* good. If not, it is bad That an act is pro or anti-chain store, pro or anti-monopoly, pro or anti-labor union, pro or anti-utility is not the question. The question is: What will it do to employment? That an act is aimed to correct abnormal abuses is not enough. We must also ask, "What effect will it have on normal business?"

So much for putting men back to work. How about keeping them there? The first requirement is that we avoid another 1929 and the following years of distress.

It should be a source of national satisfaction that we have now on the statute books all the means that our present state of knowledge can suggest in the way of preventives of destructive speculation. I refer to the SEC and the new powers of the board of governors of the federal reserve system. We cannot be sure that these powers are now or will be in the future used with the maximum of wisdom. That can never be assured by any legislative enactment. But the tools of control are provided. We must acquire increasing skill in their use.

Business Risk Is Necessary

Particularly with reference to the SEC the lesson which both legislative and administrative branches most need to learn is that the complete elimination of business risk would be dangerous. The elimination of risk brings with it the destruction of business enterprise, which in turn invites—nay, necessitates—authoritarian control of our economy if a very low scale of employment is to be avoided.

There will always be incidental and frictional unemployment. For this we have two institutions already established. The first is the system of unemployment benefits, which needs improvement and expansion as we gain experience with it. The second is the provision of relief, which needs complete reorganization along lines which we cannot take the space to discuss here.

We now come to a new institution which we have it in our power to provide as a capstone to our structure. This is organized governmental employment, expanded and contracted on the basis of a flexible budget which is itself unbalanced on the side of expenditure during periods of low employment, unbalanced on the side of debt retirement during periods of prosperity, but kept in full balance over the full cycle. Thus we may provide new employment as a private employment declines, and release workers as private employment grows.

Ralph E. Flanders
President
Jones & Lamson Machine Co.
Springfield, Vt.

Flexible Budget Proposed

This plan supposes a normal budget of expenditures well within the average governmental income. It supposes that congress authorizes the administration to exceed this budget in conformity with the increase of unemployment, and that congress requires it to diminish expenditures as unemployment shrinks.

It supposes a further development of the federal employment service with its affiliated state bodies so that it can furnish the statistical basis for this policy. It supposes an administrative body for releasing useful construction projects and other expansions of federal activity in such undertakings and such localities as will most nearly meet (in place and kind) the unemployment which is revealed by the statistics. It supposes that the employment is normal in every respect—no fancy theories tied to it. Quite evidently it supposes the disappearance of the WPA which has none of these characteristics.

The practicality of this policy is based on the historic fact that from generation to generation organized society requires that more of the things it desires shall be furnished by government. It rests on the further fact that many of these wanted things or services may be postponed or accelerated to match the employment index.

Concomitant policies of taxation, project preparation, fiscal procedure and administration will have to be developed. The difficulties are great but not insuperable. The end result is a consummation devoutly to be wished, and one not beyond our reach.

Work for All Who Should Work

The consummation sought is that *no one who is able and willing to do work useful to society shall for long lack profitable employment.* The great amount of new work needed to give a reasonable standard of living to our fellow citizens, both through private enterprise and governmental employment, assures us that as a physical problem this means of curbing unemployment is soundly based. We must make the idea a reality.

Herein lies the responsibility of the business man. He must gain an understanding of the positive role that government can play in maintaining business activity through organized public employment. More immediately, he must follow up each genuine relaxation of governmental restriction by a renewed exercise of the paralyzed functions of business enterprise. This will end large-scale unemployment.

Flying Cutoff

■ This drive for a combined roller leveler and flying cutoff machine made by McKay Machine Co., Youngstown, O., utilizes a heavy duty variable speed transmission and a gear reduction to the shear. Motor drives to the transmission through a belt. Flywheel on this shaft evens out load peaks. Machine handles strip 6 x 1/8-inch at speed of 115 feet per minute, cutting lengths from 30 inches to 20 feet. Photo courtesy Foote Bros. Gear & Machine Corp., Chicago

Windowless

■ NEW WINDOWLESS plant of Simonds Saw & Steel Co., Fitchburg, Mass., now is in full operation. In a single 5-acre room all activities connected with the production of this 107-year-old company's line of saws, machine knives, files and other cutting tools are carried on under completely controlled conditions. The room also contains the engineering department and offices. It is manned by employes drawn together from the 17½ acres of manufacturing space in the three old plants, at Fitchburg and Chicago, which it displaces. Operations are on a basis of two 8-hour shifts five days a week, as planned when the depression interrupted the development in 1931 after walls and roof had been erected.

A principal feature is that each employe enjoys absolute uniformity of light at his job, regardless of the hour or weather conditions. More than 1400 100-watt fluorescent tubes provide a blanket of "cold" light over everything. Shadows are eliminated and 20 to 25 footcandles of light reach the working plane from all directions. This facilitates high precision work required by products which must cut accurately and wear evenly.

Then, the atmosphere inside the plant is kept clear, cool and comfortable despite the presence of some 70 heat treating furnaces, more than 1000 individual motor-driven grinders, cutters and other machines which are in almost constant operation.

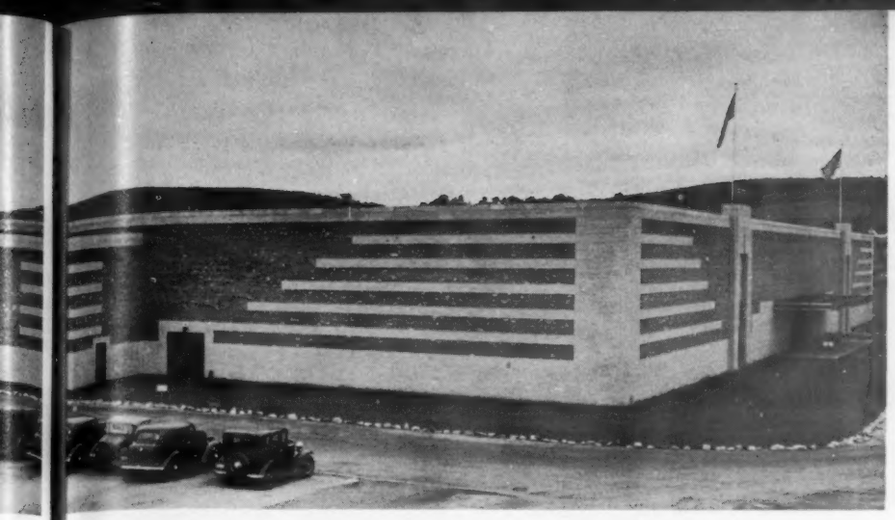
The furnaces themselves are served by three underground flue gas exhaust systems with suction fans to draw gases directly outside from sixty-three different locations. While hundreds of emery wheels throw off sparks and dust in the grinding of saw teeth and knives, the air is kept clear of all such particles by thirty dust removal units serving several hundred machines of this kind. These units filter the air and then recirculate it.

Large air-conditioning units in four building extensions circulate 400,000 cubic feet of air per minute through 3000 lineal feet of overhead ducts to provide five complete air changes per hour. Automatic controls are set to maintain maximum comfort. This is provided in the summer by blowing the air through sprays of water which flows at 52 degrees Fahr., from four artesian wells yielding 1100 gallons per minute. Air is also forced direct from these units to mancoolers which moderate the temperature around the furnaces and drive warm air up into the curtained ceiling areas above them, where all used air is exhausted through 42 roof ventilators.

Four large drop hammers which forge the teeth for inserted point saws, and similar equipment, are isolated from the rest of the building by special foundations and shock-absorbing insulation, so that delicate precision testing equipment in the metallurgical laboratory a few aisles away is not jarred.

Walls of acoustic block and a

(Above)—Office employes work without difficulty in the same 5-acre room where 8 production lines are functioning. No partition of any kind is used. (Below)—Looking down entire length of file production line from walkway. Heat treating and sandblasting units are at left. Even distribution of light shows no trace of shadows



Plant .....

Light is uniform despite hour or weather. Air conditioning provides all-year comfort. Work done in 17½ acres now is done in five. Workmen function more efficiently. Equipment is active 80 hours a week instead of 40. Many advantages result

cork-filled ceiling designed to absorb more than 90 per cent of the sound have muffled the noise created by this maze of metalworking activity to a point which enables the telephone switchboard operator to work right out in the room without difficulty. Office employes can take dictation given in a normal voice with ease, uninterrupted by drifting comment from nearby desks.

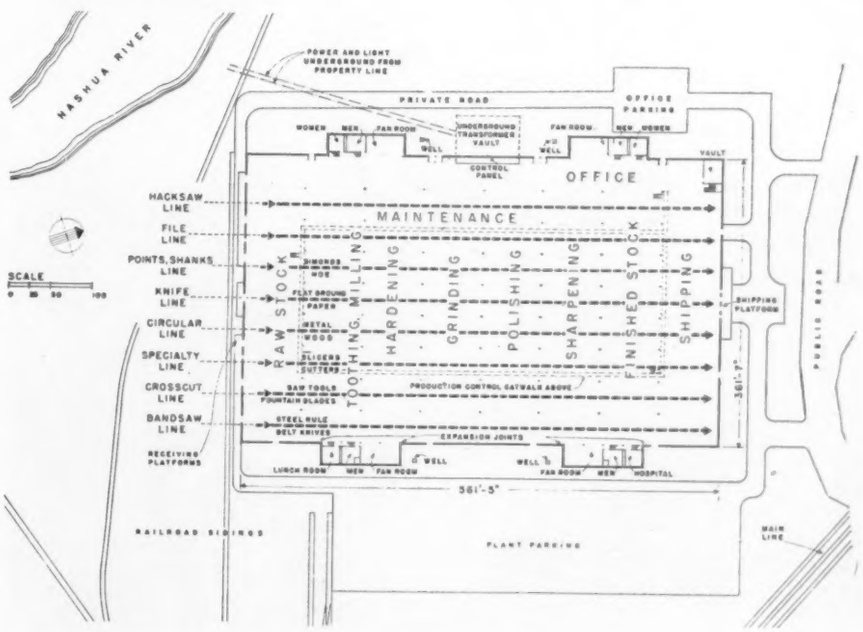
A quarter-mile protected walkway, four feet wide, has been provided for visitors who are welcomed daily except Saturday. From this promenade, which commands a sweeping view of the entire plant, men can be seen working cold steel at anvils in perfect comfort a few steps from glowing furnaces, while others are tending large wet grinders in the next aisle and engineers are working over drafting boards in the distance. Each group required special facilities in the old plants—north light for anvil work, a special vented building for heat treating, a special kind of floor that meant a separate room for the wet work, and a drafting room for drafting. Now they are sharing one room with 700 other employes and like it.

With all machines painted a bright yellow, all furnaces and benches painted aluminum, all steel columns, stairs and walkways green, and the ceiling a light cream, color plays an important part in maintaining high safety standards in the plant.

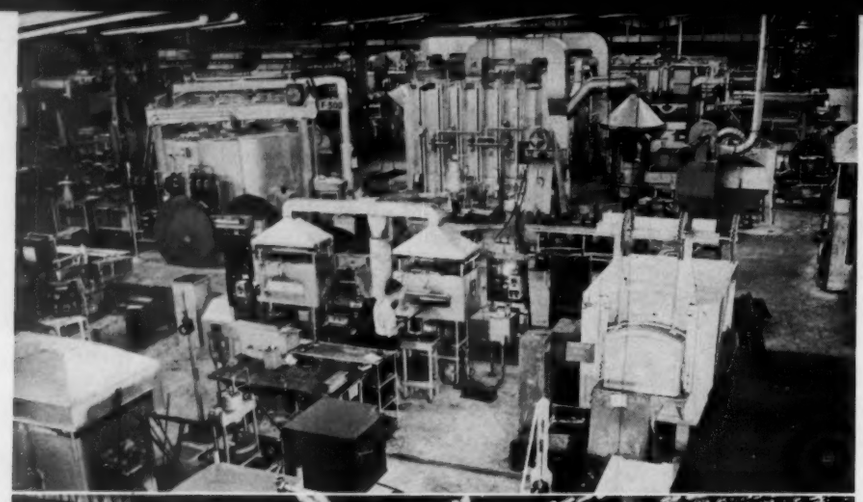
Ability to control all of these factors has enabled the Simonds management to set up eight self-contained production lines under one roof, each performing all the operations required to convert raw materials into finished products of a particular type under conditions conducive to high efficiency and the required uniform high quality of product. Thus, each of the several thousand different types, sizes and grades of saws, knives and files made by the company moves in a straight line through the sequence of toothing, milling, hardening, grinding, polishing and sharpening to finished stock bins and shipping platform under accurate control.

When the necessity for routing every item to a number of isolated departments for heat treating, hot and cold forging, wet grinding and other operations, anywhere from one to four times, disappeared, departmental supervision was abandoned and line foremen appointed for each line. These foremen also control the scheduling of production under a policy which makes them responsible for the maintenance of stock between certain limits and has helped effect a progressive reduction in process inventory. With all stock exposed to view and work in process noted by the line foreman on homemade forms posted on the finished stock bins, there is no occasion for other production records, so none are kept.

The need for telephones, like that for records, has been reduced to a minimum by the planned layout, and there are only four connections in the entire building, which is linked to the executive offices uptown by a switchboard in the plant. A pneumatic tube connects the raw stock control point and the office,



Layout of plant showing the 8 self-contained unidirectional production lines. Note expansion joints in wall



(Above)—More than 70 electric and gas-fired heat treating furnaces function without interfering with air-conditioning system. Man coolers near furnaces drive warm air through roof ventilators concentrated above curtained ceiling over furnace area. (Below)—View down band-saw line

but the management relies on direct contact for all other inside matters. This is simplified by location of the offices at one end of the finished stock, where one foreman has charge of things.

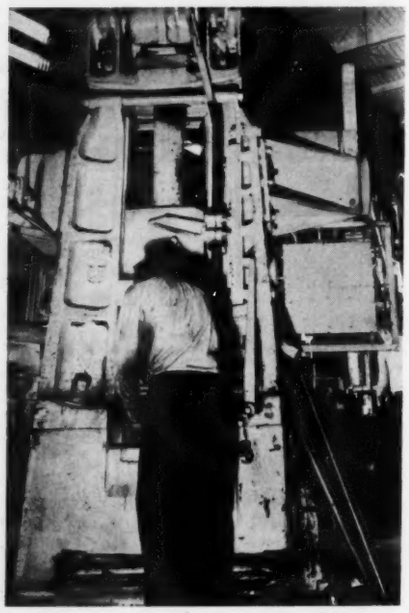
As laid out, the plant accommodates the bulkier products along the side farthest from the offices. These include wide band saws and cross-cut saws and the larger circular saws, while the machine knives, points and shanks, files and hack saws end up in finished stock shelves which form a functional barrier setting the office off from the rest of the plant. These shelves also provide a back drop for the modern display lounge where a receptionist presides without a telephone, just opposite the entrance reserved for office employes, visitors and men in search of employment. Fine grained woods and rich leather upholstery in these distinctive furnishings give special significance to the products displayed, since the wood and leather in them may have been cut and slit by Simonds blades, which are sold throughout the wood, metal and leather-working industries.

Buff colored face brick, surmounted by a stone coping, frames the plant's massive exterior walls of used common brick and illuminates them by pyramided horizontal stripes which extend into the red brick from the corners. The resulting modern effect emphasizes the building's horizontal sweep and at the same time gives an impression of height which is enhanced by the face brick pilasters supporting the flag poles at the street facade.

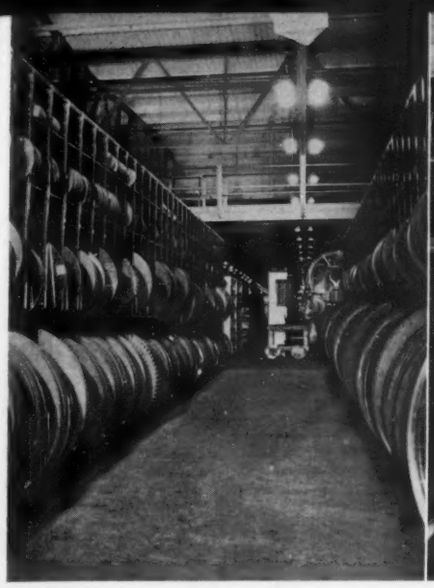
A deep canopy, faced with black structural glass and stainless steel, overhangs the broad loading dock where trucks drive in over a depressed driveway to pick up outgoing shipment on a level with the production floor. Steel canopies of similar design have been provided at the rear of the plant, where two receiving docks accommodate the special alloy steels shipped in from the Simonds steel plant at Lockport, N. Y., on specifications from the Fitchburg plant.

The building itself, designed and installed by The Austin Co., Cleveland, has structural members which were shop welded and introduce special jack trusses to support intermediate roof sections between columns spaced 70 feet apart in 40-foot aisles. This leaves but 56 columns in the entire working area, which affords an 18-foot clearance below the roof trusses. Special roof construction, with a ceiling surface

All power entering plant passes through this 66-foot dead front steel switch-board. Power ducts under floor are installed on 10-foot centers and have access openings every two feet



Drop hammers are isolated by special foundations which are separated from other sections of the floor by shock-absorbing materials. Acoustical walls and ceiling absorb most of the sound reaching them



(Left)—View of racks storing raw saw stock. (Right)—Finished stock bins with all stock in full view. Line foreman schedules production directly from inventory forms posted on bins

of perforated hollow rib metal, filled with 1½-inch slab cork and covered by two staggered layers of insulating board and bonded waterproofing, provides maximum strength and insulation without excessive weight. Heat loss and absorption are further minimized by the 17-inch wall construction, which has a dead air space between the exterior brick and the acoustic type cinder block on the interior.

Lavatories, wash rooms, coat rooms, a ladies lounge and hospital have been provided in the lean-to extensions where the air-conditioning units are located. Readily accessible from all portions of the plant, these facilities have tiled floors, glazed tile wainscoting and sanitary fixtures with foot controls.

Seventeen thousand lineal feet of underfloor power ducts, 38,000 feet of piping, 60,500 feet of galvanized iron conduit and more than 30 miles of wire and cable have been installed in the building, where push-button controls are practically universal. These lines carry power, light, water, gas, steam and air direct to machine and furnace locations by passing above trusses, down columns and under the floor, leaving the working area clear. Central control of process piping is provided in the individual bays.

Electric power to meet the plant's connected load of 6000 horsepower is provided chiefly by the local public utility company and supplemented by the output of three diesel engines operating at the old Simonds file shop nearby. All power entering plant is controlled through a totally enclosed 66-foot "dead-front" steel switchboard situated just inside the west wall, beyond which are the transformer banks.

The utility power is delivered at 13,200 volts and is transformed to secondary voltages of 2300 volts, 3-phase, 60-cycle for the operation of motors 50-horsepower and over; 440 volts, 3-phase, 60-cycle for distribution through fused panel boxes to the underground duct system installed on 10-foot centers to serve all portions of the plant; 220-volt, single-phase, 60-cycle for the operation of electric furnaces, and 110-volt, single-phase, 60-cycle for fractional-horsepower motors. The diesel output of 500 kilovolt-amperes is generated at 220 volts, stepped up to 2300 volts, and transformed to 440-volt, 3-phase, 60-cycle for air-conditioning units, and to 110/220-volt, 3-phase, 60-cycle, for the lighting system.

A 400-kilovolt-ampere direct current generator set, driven by a 2300-volt, 600-horsepower synchronous motor, provides direct current at 115 volts and 230 volts for the operation of magnetic chucks and variable speed motors, respectively.

Steam required for processing and by air-conditioning units for winter heating is provided at 100 pounds pressure by three boilers of rated 225 horsepower each, available in a separate boiler house acquired with the plant site. A steam driven air compressor supplies air at 100 pounds pressure to the plant, where filters facilitate delivery without moisture.

With the benefits of these facilities in a co-ordinated layout where plant conditions can be controlled, equipment is active 80 hours a week instead of 40 hours, with double the opportunity to wear itself out before obsolescence overtakes it. This fact enabled the management to reduce the number of production units necessary to maintain a given output by half in many instances, and has facilitated the entire modernization program in which all but its most up-to-date equipment has been eliminated.

(Above)—North light of uniform intensity is provided for smithing operations. Black canvas canopies shut off direct light from rest of plant. (Below)—Machine knives starting through furnaces. These large under-floor flues gas exhaust systems serve furnaces of this type

ADEQUATE VENTILATION A

Survey reveals 70 per cent of present metal producing and metal working plants suffer from poor ventilation. A 30 per cent increase in hot-weather output is reported in many plants following installation of modern ventilating systems. Typical faults and their remedies are pointed out

By FRED MERISH

■ IN FIELD WORK covering industrial ventilation, many steel mills and metal working plants were visited recently. About 70 per cent of these plants were found to be utilizing some form of obsolete or inadequate ventilating system, resulting in decreased production, higher costs, inferior output, disrupted output and delayed shipments, all brought about by poor working conditions.

Many plants are extremely hot in summer, depleting working energy as much as 50 per cent. Obviously, any air cooling or ventilating system that will maintain more comfortable temperatures is a worthwhile investment. Yet many plants hobble along from year to year with inadequate equipment producing a tremendous loss in productive capacity.

Windows and Doors Inefficient

Opened windows and doors seldom provide adequate ventilation in summer. Many mill superintendents place too much dependence upon their ventilating efficiency. In winter, with doors and windows closed, ventilation is equally important although its application differs. Some mills visited were strong on summer ventilation, weak on winter ventilation, or vice versa. Adequate year round ventilation should be the management's goal in every steel mill and metal working plant. It is a profit builder.

This field study revealed three reasons for inefficient ventilation in this industry: Installation was not properly "tailored" to fit requirements in the first place; plant enlargement or change-over after installation had rendered it ineffective; or make-shift additions to original installations had been made from time to time in the attempt to meet changing conditions and demands. As with a heating system, it is often better to scrap the original installation and modernize from scratch than make patchwork additions or repairs.

The ventilating systems surveyed were of six general types:

A—Natural ventilation by means of non-mechanical units, such as operating sash, monitors, louvres, turrets and continuous stationary trench ventilators on roof.

B—Exhaust ventilation using blowers, exhausters or fans for removing hot, foul air or obnoxious discharges from processing, such as fog, steam or fumes.

C—Supply ventilation using fans to pull air into an interior from the outside.

D—Process ventilation with hoods capping machines or processing sources, thus preventing fumes, flyings and other residue from reaching the interior and contaminating the air. Ducts, running from hoods to exterior outlet with an exhaust fan for suction, carry the discharges outside. This is sometimes called "spot" ventilation.

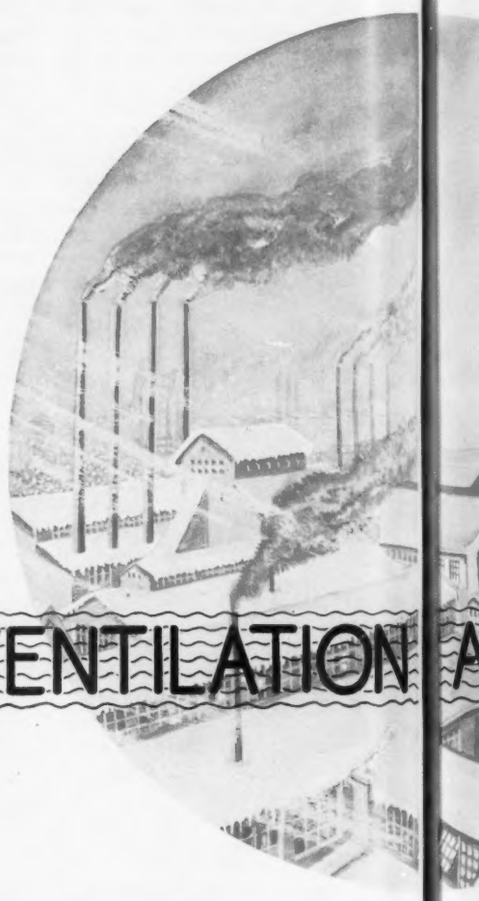
E—Filtered ventilation using air filters and dust collectors to purify the atmosphere for breathing, material finishing, drying or mechanical efficiency.

F—Variable temperature heaters to supply fresh air at predetermined temperatures for worker comfort or processing efficiency.

Requirements Determine Method

Some plants use all these types of ventilation. In one, a certain type may function satisfactorily, a different type elsewhere. It depends upon requirements. Some mills are well designed for natural ventilation via roof valves and turret equipment. Others are not. Yet, often the badly designed plants try to get by with natural ventilation to by-pass investment in mechanical units. Inadequate equipment in a number of mills was found to keep production at minimum. In mills where modernization had been effected, superintendents reported up to 30 per cent increased production during extremes of hot or cold weather.

Too many mill superintendents, it was found, depend upon opened windows, monitors, doors and passageways for air cooling and ventilation. Seldom are they adequate in this industry where interior heat runs high and where steam, fumes, humidity, condensation and dust are also factors. In many plants visited, greater worker comfort, cleanliness, health, increased output and lower plant maintenance would accrue from the installation of power-driven units to aid natural ventilation.



In some steel mills and metal working plants, the managements were utilizing circulating fans on pedestals, walls or ceilings in the attempt to cool interiors and maintain maximum production. In other mills, they were using fans in unit heaters for the same purpose. This is interior air circulation, not ventilation. It does little good by itself because only stagnant plant air is being churned when it should be replaced with fresh air from outside, producing enough air-turns per hour to keep the interior comfortable.

N AS A PROFIT BUILDER

Such turnover can be obtained only by a ventilating system expertly fitted to the job.

Air turnover is as important in ventilation as it is in heating. One main reason why heating systems in steel mills and metal working plants give substandard results is lack of proper ventilating facilities. Heating and ventilating must co-ordinate to give comfort in winter, otherwise, one is a drag on the other.

Circulating fans will provide a comfortably cool interior in summer if properly synchronized with exhaust fans emptying the hot, foul air. Last year, one mill installed 16 circulating fans, suspended from the ceiling and all facing the same direction. Thus they set up a continuous flow of air from one end of the building to the other where two exhaust fans kept flushing out used air continually, fresh air coming in through opened windows and doors. Production increased 30 per cent. No work had to be suspended because of heat, a common occurrence before installation.

A continuous opening roof ventilator was noticed in some plants. This is a nonmechanical type, low in first cost and upkeep, a natural medium designed to assist discharge of heat by utilizing outside air currents to create suction. Such currents, plus the natural tendency of heat to rise, provide high capacity stack drafts, particularly when wind velocity outside is high.

This unit, installed in skylights, eliminates the troublesome operating skylight and provides ventilation with light at little more expense than the ordinary skylight. However, natural ventilation is often handicapped when weather conditions are unfavorable or when "peaks" exist. When there is no appreciable wind velocity, results are not so good.

Often, too much dependence was placed on nonmechanical ventilation, some mills were improperly aerified at times. In other mills, wiser heads had installed mechanical aids to stimulate ventilation when natural sources were inadequate. This combination keeps operating costs down and assures dependable, uninterrupted service.

Night cooling deserves more consideration. It involves the operation of ventilating fans at night. Sucking in the cool night air, they make an interior more comfortable for the next working day. The heat near the ceiling of a steel mill may be terrific after a day's processing in hot weather. In the ordinary store, the heat built up during the day stratifies under the roof to a temperature around 120 degrees at times during summer. Imagine what it may be in a mill where heat from processing aids the sun!

Some plant managers try to flush out this hot air by opening windows at night or installing louvres at strategic points but this can not be relied upon to do the trick. Hot air rises and clings like a barnacle to the roof, remaining all night to plague workers the next morning. Night cooling fans flush out this hot air and draw in the cool night air at regular intervals, leaving an interior 10 or more degrees cooler than ordinarily and making it comfortable when workers arrive the next morning.

Night Cooling Found Satisfactory

The few mills where we found night cooling reported excellent results, elimination of the costly early morning lag in hot weather, the same depressed condition common to workers in mills where heating is inadequate and early morning winter cold chills the marrow. Workers are more peppy and snap into production faster when mills are comfortable upon entering. Some night cooling installations require no ducts, others need them. It depends upon conditions.

The destructive influence of condensation resulting from saturated air and fog around pickling and plating operations is accepted by too many steel men as a necessary evil. Adequate ventilation can eliminate it. In some mills, we found that production in the pickling department had increased as much as 30 per cent after adequate ventilation had been installed because workers previously had been hindered in operation with heavy fogs and fumes. Fog and condensation result from hot saturated air within a building and lower temperatures outside. To treat fog and condensation properly in winter, heated air must be introduced into the building, circulated, then exhausted. When the supply and exhaust are properly balanced, the condition will be eliminated.

Balance Exhaust and Supply

Too many maintenance men think of ventilation in terms of removal only, getting out the hot stale air, flyings, vapors and fumes, otherwise known as exhaust ventilation. However, ventilation has two functions, exhaust and supply, and every system must be properly balanced to this end.

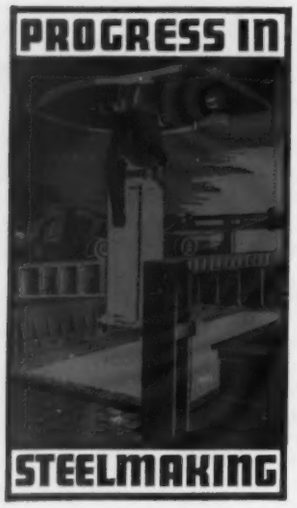
If impure air is removed, other air must enter to replace it, whether it is blown in mechanically or flows in naturally through opened windows, doors and cracks. Some systems operate efficiently where exhaust fans force the air out of a building or room to openings on the opposite side.

In some mills, fans without ducts or hoods over machines exhaust the obnoxious fumes, smoke, steam, heat, fog or gases. In other cases, hoods cover the processing unit and the excrement of production passes through ducts to the outside with exhausters for stimulus. Ventilation is not just placing an exhaust fan here or a circulating fan there. From this field survey, it appeared that many mill managements seem to think so. Adequate ventilation is a job that requires correct equipment at the right places.

It is best to employ an unbiased ventilating engineer to prepare the layout. There are many ventilating products on the market. Trying to appraise their adaptability often will confuse the layman. Insist upon dependable equipment. Cheap devices are costly. A number of mills reviewed scrapped cheap units after a year or two of headaches or they were inefficient and expensive to operate.

Humidity is a bad actor in sum-

(*Please turn to Page 77*)



Electrolytic Cleaning

Recent developments in continuous electrolytic cleaning of strip make possible a base metal having a surface better adapted to subsequent plating, polishing and finishing operations. This assures a higher quality product and reduces rejects from poor finishing

By **WESLEY F. HALL**
Chief Designing Engineer
Hanson-Van Winkle-Munning Co.
Matawan, N. J.

■THERE IS a definite need for a base metal better prepared for subsequent plating, polishing and finishing operations to eliminate failures of finish and imperfect plating. Best preparation of the base or basis metal appears to be by a treatment which thoroughly cleans the surface. We believe the best surface treatment is electrolytic cleaning. Only by this method is it possible to remove all rolling oil and dirt accumulated in cold rolling tinplate stock, for example.

To function economically, cleaning operations must fit into the line of continuous strip production. The following is typical of electrolytic strip steel cleaning operations.

Coils of tin-can stock, 0.01-inch thick, 36 inches wide, 5000 feet long and weighing about 6000 pounds, come from 4-high strip rolling mills. These coils are delivered on their side in front of the uncoiler, covered with a rolling oil. Strip then goes to an uncoiler unit which opens the coil and welds the tail end of the preceding strip to the front end of the oncoming strip. Because the line speed is high (over 900 feet per minute) it is considered best practice to stop the line for welding the strips rather than to allow them to form a loop which might, in extreme cases, become as long as 1000 feet.

It requires about 15 seconds for the weld after the strip is correctly clamped in position. Such an alternating-current seam weld has a high ultimate strength because of its structure of overlapping spot welds. Speed of strip is built up gradually to its maximum after the strip joint has been threaded correctly through the equipment.

Strip then goes through fabric pinch rolls which exert a braking action and keep the strip from piling up, buckling or pulling too tight in any one place. If the machine stops suddenly, the pinch rolls prevent the strip from "coasting" or dragging on the grids in the cleaning tank and perhaps jamming the machine. These pinch rolls consist of a number of 10-inch buffs built up to the necessary width, densely packed by putting the sections under high pressure.

Washer Sprays Solution

The strip then travels from the pinch rolls to the washing machine. This is a power washer which sprays hot cleaning solution onto the strip from above and below at high velocity. Specially designed and placed nozzles are supplied with the proper quantity of solution forced in by a centrifugal pump. The solution is drawn from a large reservoir set under the washer and falls back into this reservoir after the washing is complete. Steam heating coils and thermostats act to maintain a temperature close to 200 degrees Fahr.

From the washing machine, the strip moves through a set of wringer rolls of the same construction as the pinch rolls described above. These squeeze out the solution which otherwise would be dragged out.

The washer acts chemically and mechanically to remove most of the oil and dirt. In many cases these washers are furnished with a set of separately driven Tampico brush wheels mounted to revolve against the direction of the strip, brushing from above and below simultaneously. In some cases the same solution

Entry end of continuous electrolytic cleaning line at plant of Carnegie-Illinois Steel Corp., Pittsburgh

Wickwire Spencer manufactures High and Low Carbon Rods and Wires—in various tempers, grades and finishes—for your specific purpose. Hard-Drawn, soft or annealed Basic or Bessemer Wires—Hard-Drawn, annealed or Oil-Tempered Spring Wire, Chrome Vanadium Spring Wire—Valve Spring—Music—Clip—Pin—Hairpin—Hook-and-Eye—Broom—Stapling—Bookbinding—Machinery Spring Wire—Reed Wire—Clock—Pinion—Needle-Bar—Screw Stock—Armature Binding—Brush—Card—Florist—Rope—Mattress—Shaped—Welding. Flat Wire and Strip Steel, High or Low Carbon—Hard, annealed or tempered—Clock Spring Steel—Corrosion and Heat Resisting Wires. Consult the Wissco technical man on your wire problems, however large or small.

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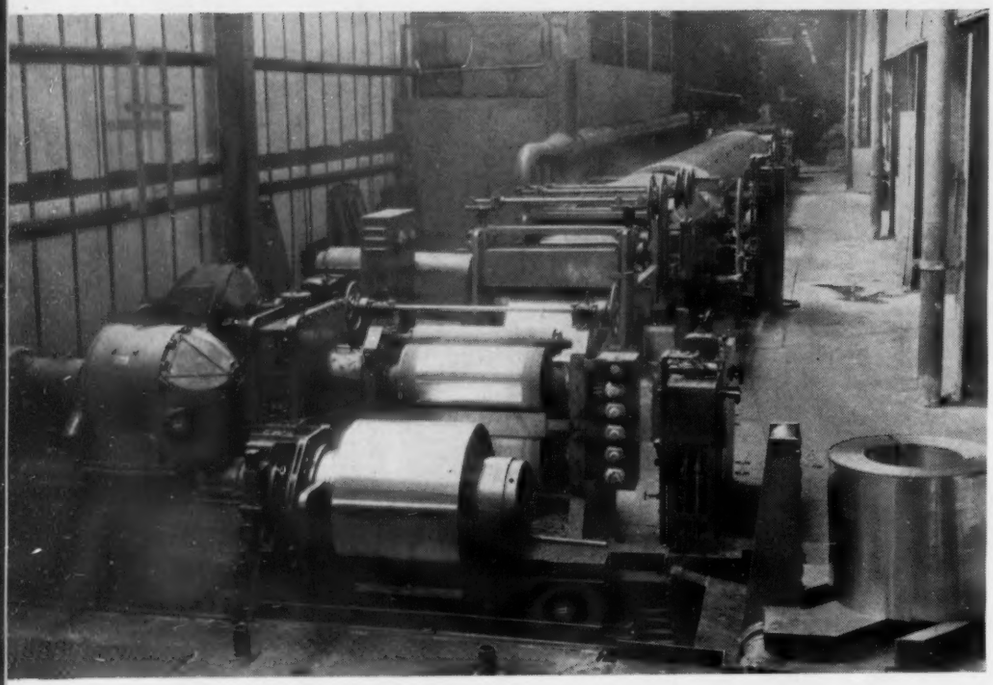
WISSCO WIRE
by Wickwire Spencer



Recoiling end of continuous electrolytic cleaning line

is used in the washer as is used in the electrolytic tank which will be described below (except that in many cases an emulsifying and wetting agent is added in the washer). Special care is taken so foaming does not occur since this washing tank is agitated constantly.

From the wringer rolls which follow the washing machine, the strip goes to the cleaner tank. Here a commercial alkaline cleaner is used. The tank may be over 60 feet long in a single compartment. It has a large floating type submerging roll at each end to bring the strip to the proper subsurface pass line. At this pass line the strip travels between several sections of specially designed large-surface electrodes, or grids, spaced along the entire length of the tank. Purpose of the grids is to lead the current into and out of the solution through the strip.

The lower grids are fixed while upper grids are made removable for repair purposes and ease of threading a new strip. Special covered support rolls serve to maintain the strip at its proper pass line to insure equal cleaning on both sides of the strip. The tank system is divided into two electrical sections, but the tank itself is kept out of the circuit to prevent current leaks and to permit independent operation of two generators on the same tank of solution. Current leaks of all kinds, including stray or uncontrolled currents, are kept below 2 per cent.

The solution is kept hot and the temperature is maintained thermostatically by controlled steam admission to heating coils. Entire tank is covered with a hood to take off the vapors which are constantly evolved. At the delivery end of this tank the strip passes through another set of wringer rolls to eliminate excessive drag-out.

From the last wringer roll, the strip passes to a scrubber which consists of top backing roll to keep the strip pulled taut and in position for scrubbing; Tampico brush underneath scrubbing the underneath surface and sprayed with hot water to keep the bristles free; and second backing roll.

The strip passes over and under these backing rolls. The Tampico brushes are rotated at high speed against the direction of travel of the strip and at considerable pressure. Warm water sprays the strip as it is brushed, improving the brushing and decreasing brush wear. Entire scrubber is enclosed by flush guards. Waste water goes to sewers.

Rinse in Hot Water

From the scrubber, strip passes through a hot rinse which is simply a tank of the proper length to give a one-second dip in almost boiling water. Thus tank also is covered by a vapor hood with an exhaust system connection.

After leaving the hot rinse tank, the strip is hot enough so it only has to pass through a series of cloth wringer rolls to be dry completely. It then is ready for recoiling after which it travels on through the mill for further fabrication.

According to M. Stone*, manager of the development department, United Engineering and Foundry Co., Pittsburgh, the direct cost of the above cleaning operation varies 10 to 20 cents per ton of tinplate strip cleaned. If the various charges such as maintenance, interest, depreciation costs, etc., are added in, the total cost is something less than $1.00 per ton.

This type of installation is a joint development of the Hanson-Van Winkle-Munning Co., Matawan, N. J., and United Engineering and Foundry Co., Pittsburgh.

* Credit is due Mr. Stone for his article "Electrolytic Cleaning of Strip Steel," published in *United Effort*, which supplied data for this article.

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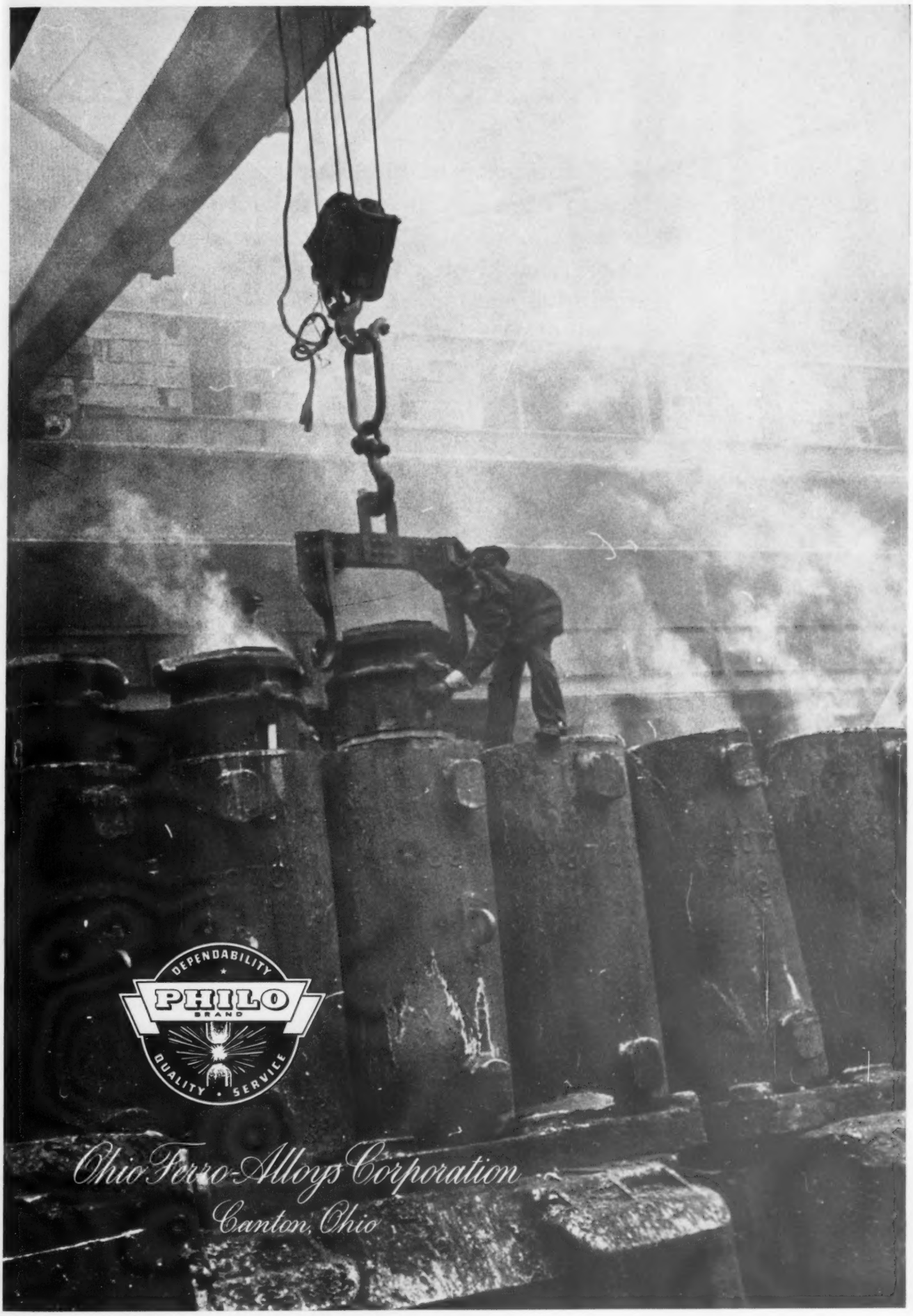
Iron-Nickel Alloys Treated Exhaustively

■ *Alloys of Iron and Nickel, Vol. I, Special Purpose Alloys*, by J. S. Marsh; cloth, 593 pages, 6 x 9 inches; published for the Engineering Foundation, by the McGraw-Hill Book Co., New York, and supplied by STEEL, Cleveland, for $6; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London, S.W. 1.

This volume is the tenth of the "Alloys of Iron Monographs, prepared under auspices of the iron alloys committee of the Engineering Foundation. As its title indicates, it is the first of two on alloys of iron and nickel, and is devoted to the constitution and properties of high purity, iron-nickel alloys and properties of special-purpose alloys. The second will be concerned with engineering properties of nickel steels and cast irons.

The present book is divided into 13 chapters of which the first serves as introduction, giving historical features. Chap. II discusses the iron-nickel system, describing high and low temperature portions of the diagram. The iron-carbon-nickel diagram is the subject of Chap. III and constitution of complex iron-nickel alloys is reviewed in Chap. IV. Chap. V gives information on physical properties of iron-nickel alloys, including elastic constants, lattice constants and densities, and thermal properties.

Chap. VI is concerned with thermal expansion and magnetic properties of iron-nickel alloys are fully detailed in Chap. VII. Magnetic properties of complex nickel-iron alloys receive close examination in Chap. VIII and mechanomagnetic properties are discussed in Chap. IX. Electric properties are described in Chap. X, and Chaps. XI and XII are devoted to mechanical properties of iron-nickel, and complex iron-nickel alloys, respectively. The final chapter is concerned with corrosion of iron-nickel and iron-nickel-chromium alloys and with scaling. An extensive bibliography with 619 references and a name and subject index complete the book.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Prewelded Turbine Blades

Hard surfacing of blade tips with a material having high initial hardness and susceptable to work hardening protects power plant turbines from destructive effects of cavitation, eliminates shutdown periods, hence increases station utilization factor

By L. M. DAVIS
Hydraulic Engineer
Pennsylvania Water & Power Co.
Baltimore
And
J. M. MOUSSON
Hydraulic Engineer
Safe Harbor Water Power Corp.
Baltimore

■ HIGHER SPECIFIC speeds, brought about by advent of propeller type turbines and steady increase in operating heads, has focused attention on the hydraulic phenomenon called "cavitation" and its destructive effect on turbine blades known as "pitting." This problem has grown in intensity to such an extent that it affects not only the successful operation of many units already installed, but it also appears a serious impediment to further progress in the art of hydraulic turbine construction.

Abstract from paper receiving third main award, $1,526.33, in Functional Machinery classification of $200,000 Program sponsored by James F. Lincoln Arc Welding Foundation, Cleveland.

It was soon discovered that under conditions conducive to cavitation, cast carbon-steel blades could not withstand the punishment. A belief that pitting was in some measure related to corrosion fatigue led to consideration of solid cast stainless steel turbine blades. First blades of this kind were manufactured by Swedish turbine builders. Although the tempered solid stainless 14 per cent chromium steel blades were exceedingly costly, their adoption was thought justified and their use by European turbine manufacturers appears to have been followed by satisfactory results.

American Experience Lacking

In the United States where experience to be acquired from gradual development of turbines of this kind was lacking and where no reliable and comparative operating records could be made available, engineers were not prepared to decide on stainless steel turbine blades. When the first four large Kaplan turbines were built in this country for the Safe Harbor hydroelectric development, Fig. 1, there were neither sufficient foundry experience nor adequate facilities on this side of the Atlantic at that time to produce successfully the 20 solid stainless-steel turbine blades, weighing about 12,000 pounds each in finished condition. Despite European experience, considerable doubts and uncertainties existed regarding the proper alloy content and heat treatment for the cast stainless material. Also, the Susquehanna River has periods of low flow sufficient in length to

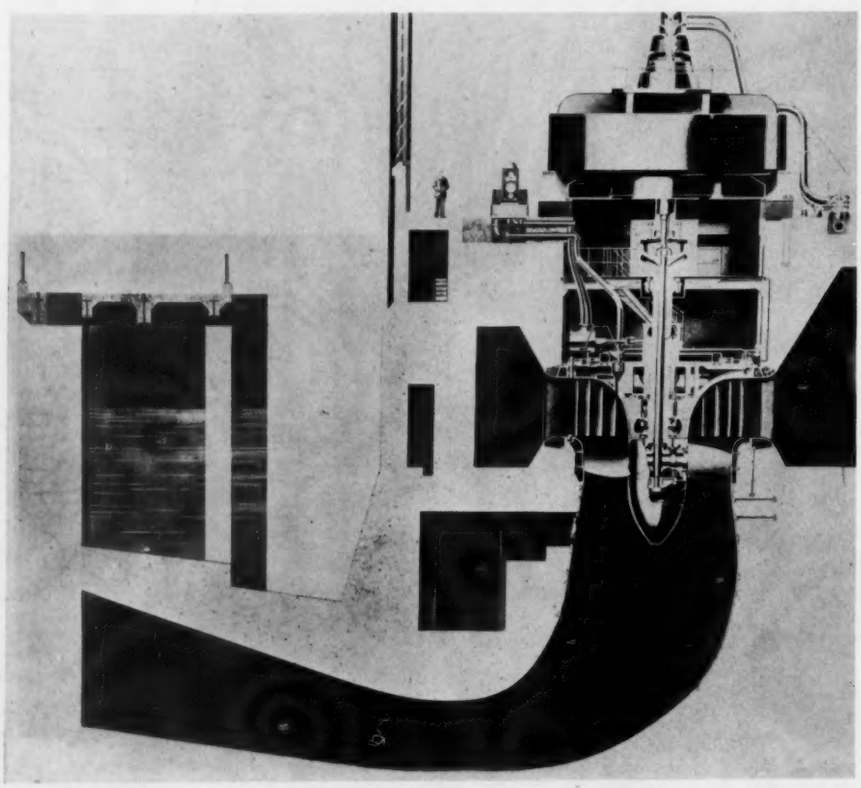


Fig. 1—Cross section through a 42,500-horsepower Kaplan turbine at Safe Harbor

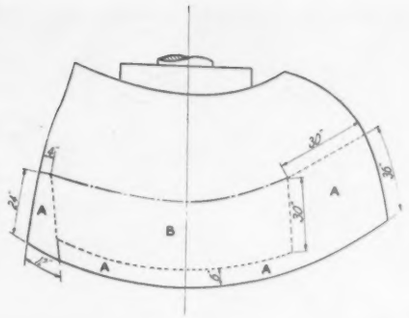


Fig. 2—Prewelded areas on suction face of turbine blades. Area A prewelded for Safe Harbor unit. Area B used in addition for estimating purpose

develop proper repair procedures without any sacrifice in the utilization factor of the plant.

So practical considerations led to an entirely different approach in this country. It was thought possible to continue the use of low priced carbon steel for the large turbine blade castings and to find sufficient surface protection of some kind through experimentation.

Operating experience with the first four Kaplan units at Safe Harbor showed that carbon steel blades could not withstand the punishment of cavitation. Sizable areas on the suction side of the blades, Fig. 3, were found to be pitted after 18 months of service. Pitted areas also were noted on the peripheral surfaces of the blades where narrow clearances make their repairs particularly difficult due to limitations in accessibility.

Although not seriously damaged, blades were given a general overhauling at the first opportunity. Affected areas were chipped to the solid parent metal, resurfaced with two coats of 18-8 stainless steel electrodes and ground to a smooth finish. This particular material was chosen because all welding had to be done overhead with the units in place and this type of welding electrode was found particularly suitable for such work.

Pitting Continues on Parent Metal

Subsequent inspection after the initial repairs showed that the areas surfaced with this particular material stood up satisfactorily. The smooth ground surface of the deposits revealed effects of cold working by a slight uneveness, best discernable by lighting effects. However, marked pitting was again discovered on a wide band of parent metal immediately adjacent to the welded areas. It appeared that periodic repairs would continue until welded areas had reached the boundary zone of cavitation.

When an identical fifth unit was installed, the peripheral surfaces of the blades were prewelded in the shop with stainless 18-8 chromium nickel electrodes since they were difficult to weld in the field.

Since this new unit was to be the first and only one for some time at Safe Harbor to generate 25-cycle single-phase current for railroad supply, only infrequent and short outages could be arranged, making it imperative that suitable precautionary measures be taken in building the new turbine to render the punishment from cavitation ineffective or at least reduce pitting to a minimum. Prewelding these blade castings appeared to furnish the proper solution to the problem.

To gain experience rapidly, an extensive research was initiated to determine the metallurgical aspects of pitting as produced by cavitation. Accelerated testing equipment was built to provide tests equal to several years of service at Safe Harbor in a run of only 16 hours duration.

Comparing results on arc welded deposits, it was noted that in general the plain and low alloyed deposits showed the least resistance, the stainless chromium steels the highest, with the austenitic stainless chromium-nickel alloys in between. Losses by cavitation appeared to follow a general trend—the harder the deposit the smaller the loss.

Apparent inconsistencies were explained by a difference in susceptibility to increase in hardness due to cold working. Rockwell tests in the pitted zones showed an increase in hardness which was more pronounced for the materials having better cold working characteristics such as the austenitic 18-8 and 24-12 varieties of chromium nickel steels. High original hardness combined

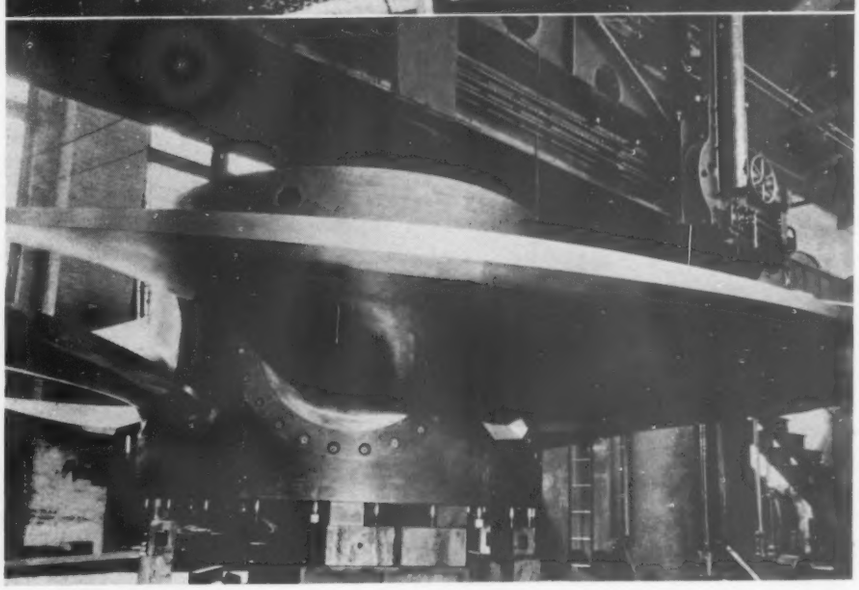
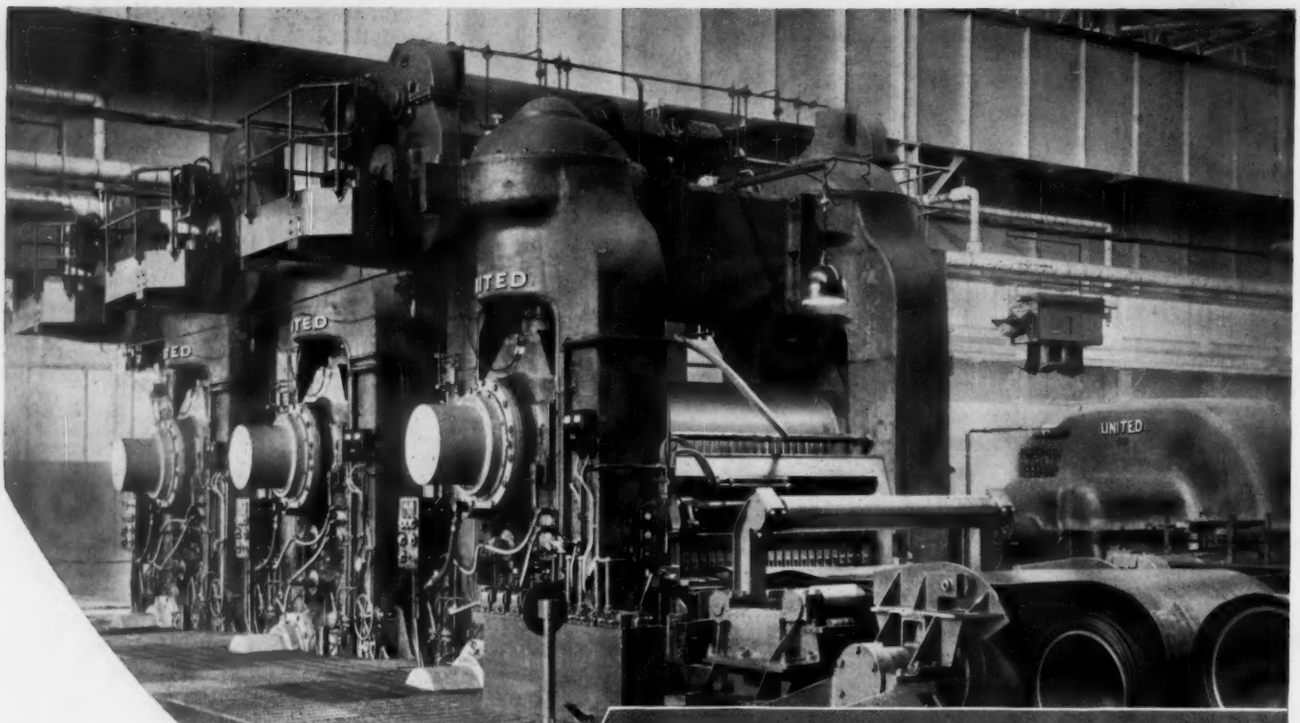


Fig. 3. (Upper)—Part of pitted area on suction face of unprotected cast steel turbine blade at Safe Harbor. Fig. 4. (Lower) — Finished prewelded runner blades mounted in runner hub. Prewelded areas on suction face and periphery clearly visible due to contrast with dark parent metal



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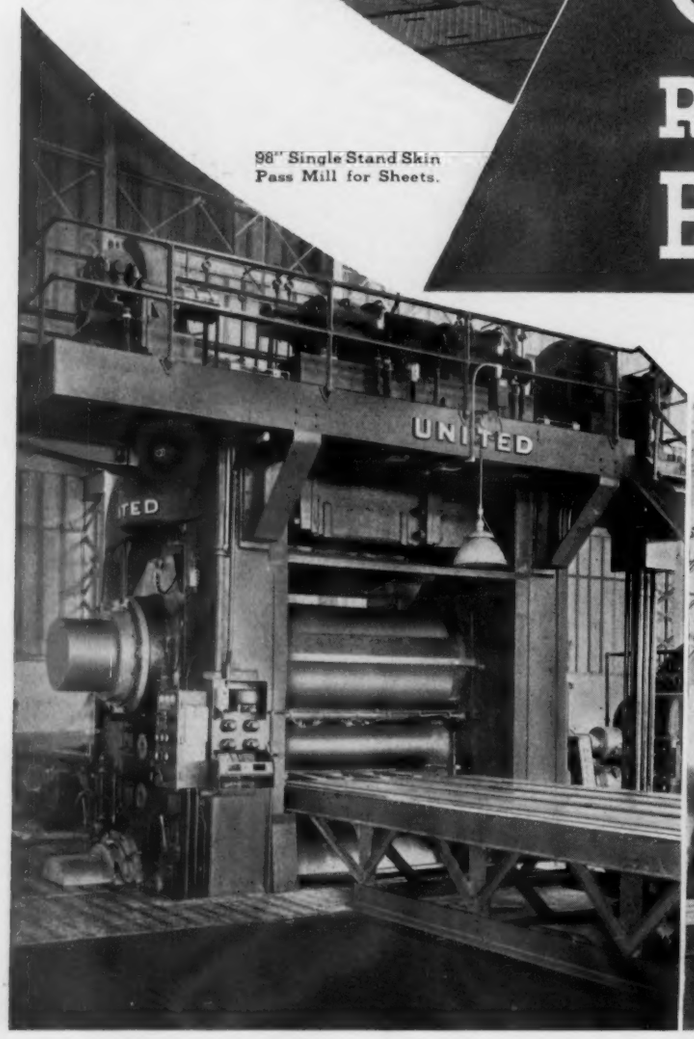
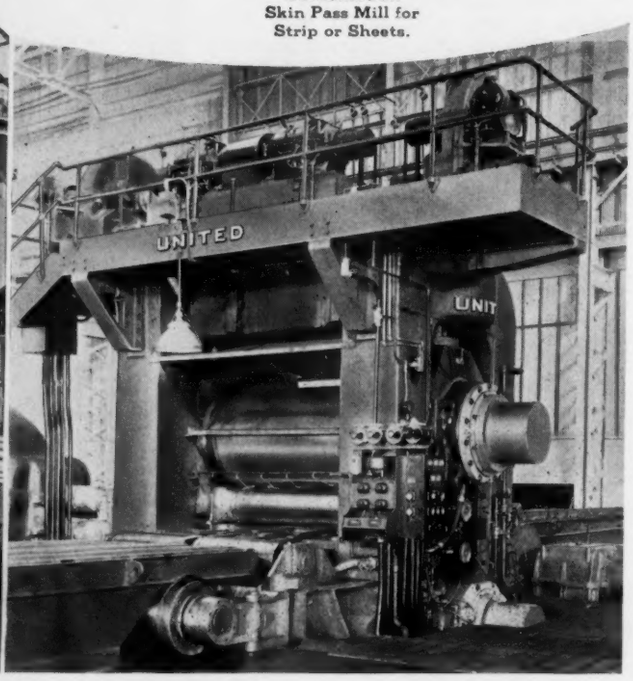
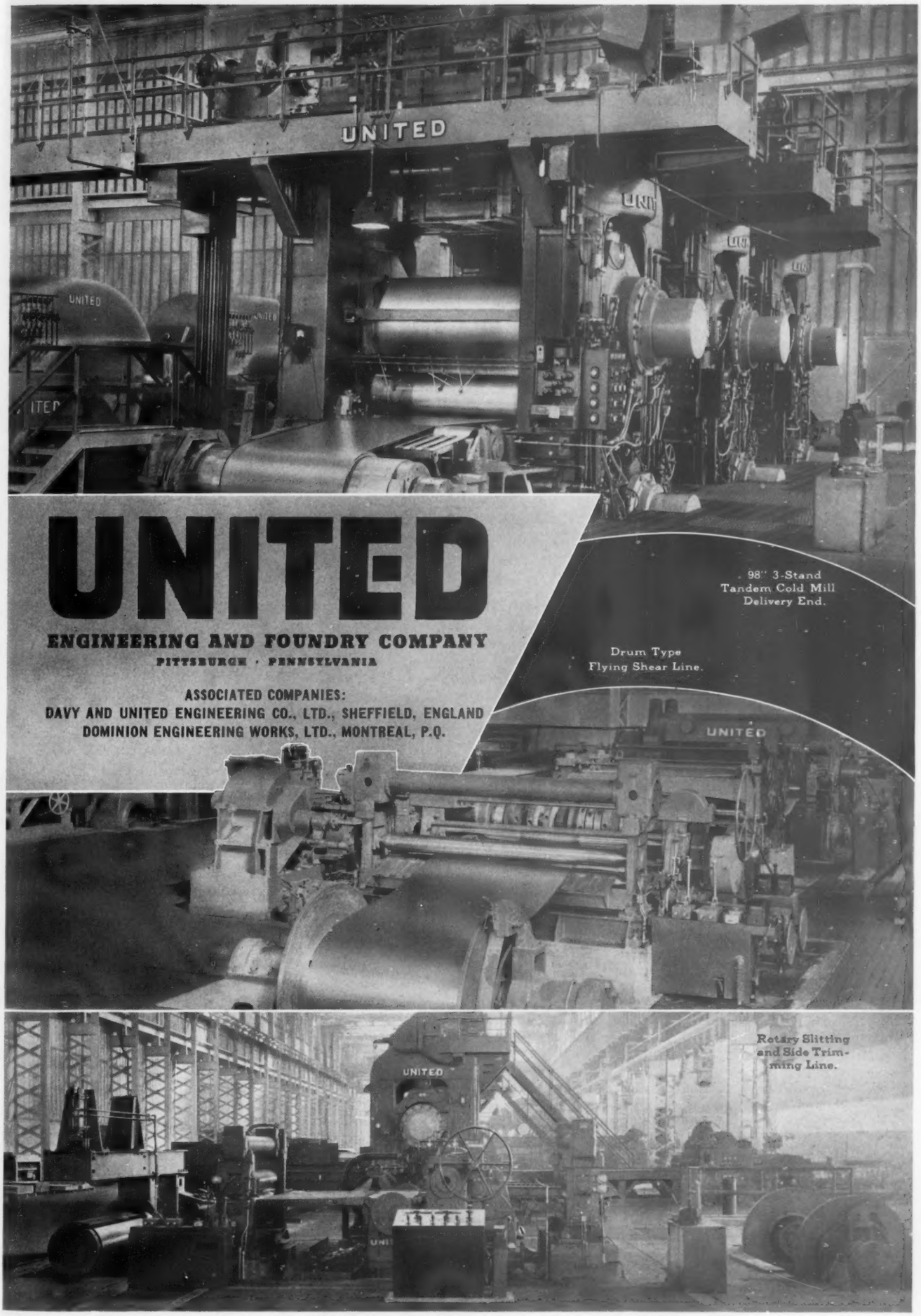


Combination Skin Pass Mill for Strip or Sheets.

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with a high susceptibility to cold working appeared most desirable. Chromium and nickel contents of the electrode analysis were sufficiently lowered from 18-8 to approach in the deposit the 17-7 chromium nickel ratio.

A combination of 17 per cent chromium and 7 per cent nickel produces such excellent resistance because this alloy is somewhat unstable, showing martensite interspersed through the austenitic matrix which would account for the extremely high original hardness. At the same time a 17-7 or 16-6 chromium-nickel alloy is more susceptible to cold working than the 18-8 or 24-12 chromium nickel steels.

Base metal appears of influence as number of layers. Two layers of welding materials were regarded as a minimum, carbon content of turbine blade castings was about 0.30 to 0.45 per cent and therefore an appreciable infiltration of carbon, highly undesirable here, could be expected in the first layer. Also, loss in alloy constituents probably is appreciably higher in the first layer and so two layers were used.

Since deposits had to be machined and ground, machinability tests were run on seven of the most promising varieties of electrodes. Of the two specimens which passed these tests, one deposit was somewhat easier to apply than the other resulting in the adoption of an 18-8 chromium nickel welding electrode.

From previous experience, it was possible to predict approximately what portions of the blades would be subject to attack by cavitation, thus indicating areas to be prewelded, Fig. 2.

Blades Rough Machined

Since considerable metal had to be removed in certain portions, blades were rough machined and then areas to be welded were machined 3/16-inch below the finished blade surface. Before welding, ridges from machining were ground off so entire area to be prewelded was 3/16-inch below the desired finished surface. Any flaws in the castings were chipped out to solid metal and repaired with a mild steel welding rod.

To prevent warpage during welding of the relatively thin blades, varying from 1 to 3½-inches in thickness, they were placed in a water bath so only that portion to be welded was out of the water. Water was circulated by an electric fan, causing the heat to be carried away as rapidly as possible from the point where the welding was being done. This rapid cooling not only reduced warpage but also reduced grain growth in the welding deposit to a minimum. This was of particular importance since the research carried out previously showed increased pitting resistance with decreased grain size.

To weld the periphery, blades were held vertically and rotated as the welding progressed so welding could be done in a downhand position. All welding was done electrically using 5/32-inch coated electrodes. Two layers were applied throughout. About 1800 pounds of electrodes were required for the five blades.

After welding was completed, blades were checked for shape. Little distortion had resulted and there was no difficulty in springing them back to shape.

Blades then were mounted for machining. It was found that the welded areas could be machined practically as fast as parent metal. The round nose cutter left ridges which were ground off and then the surface was polished carefully. Finished blades assembled in the hub are shown in Fig. 4. Here prewelded areas are somewhat lighter than the parent metal.

Economics Important

Economic considerations of prewelding are of fundamental importance. Taking advantage of recent progress in the casting of stainless steel in this country, actual quotations were obtained from several turbine manufacturers on solid cast stainless-steel blades to be compared with present costs of prewelding. For a 220-inch diameter runner with today's index base of 100 for five cast and finished-ground blades at $21,000, the saving by means of prewelding amounts to $17,500 over cast stainless chromium steel blades; $24,000 over cast stainless chromium nickel steel; and $30,000 in the case of low-carbon stainless chromium-nickel steel. Corresponding savings for machined and ground blades for the same runner diameter are $19,000, $25,000 and $31,000, respectively.

It is evident that prewelding of large propeller turbines shows substantial economical advantages over solid cast stainless-steel turbine blades. At the same time, many of the arguments in favor of solid cast stainless-steel blades also are valid for prewelded runners. Properly prewelded runners are neither subject to aging nor are their efficiency characteristics impaired with time.

Furthermore, prewelded runners likewise need no periodic repairs, increasing thereby the utilization factor of the plants in which they are used, particularly where more water is available throughout the year than is required for station use. Although difficult to evaluate, this factor alone may be responsible for millions of kilowatt-hours of additional generation by the industry as a whole and thousands of dollars of revenue may be obtainable which otherwise would be lost.

In addition, no limitations need usually be imposed on the load carried by a prewelded unit to minimize cavitation effects, a procedure found necessary on unprotected carbon-steel runners. Here again substantial benefits may accrue to the industry through additional energy made possible by means of prewelding.

Bronze Welding Rods

■ "Ready-Fluxed" bronze and manganese-bronze welding rods introduced by Compressed Industrial Gases, Inc., Chicago, are completely flux-coated throughout their length. They control the even introduction of chemically correct flux throughout entire brazing operation, preventing weld from getting too much or too little bronze and completely shielding the molten metal from time weld area is first tinned until job is completed.

The bronze rods are doubly deoxidized, resulting in virtually fumeless welds. The accurately compounded flux keeps the molten metal in a semi-plastic condition, enabling the operator to apply bronze in any position with ease.

Bronze rods may be used in any type of bronze welding of all metals on which bronze is normally used without use of additional flux.

1939 Annual Index to Canadian Trade Issued

■ *Canadian Trade Index*, 1939; cloth, 842 pages, 6¼ x 10 inches; published by Canadian Manufacturers' association, Toronto, Ont.; supplied by STEEL, Cleveland, for $6; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London S.W. 1.

This is the annual publication of the Canadian Manufacturers' association, in collaboration with government departments and commercial organizations, making it authoritative and complete.

The usual form is followed in classification and in addition to the alphabetical list of Canadian manufacturers, with detailed information about each, there is an alphabetical list of articles manufactured in Canada with the names of all firms manufacturing them.

The volume also presents in detail information as to export rules and other material relating to foreign trade, with much statistical information relating to Canadian trade.

Complete revision has been made to bring all information up to date in detail.

Exporting Trucks

Increased use of galvanized steel wire in preparation of products for export shipment results in important economies. One shipper saves $6 per truck body by elimination of lumber crating and by shortening time required for packing

By ADOLF LARSEN
Gerrard Co. Inc.
Chicago

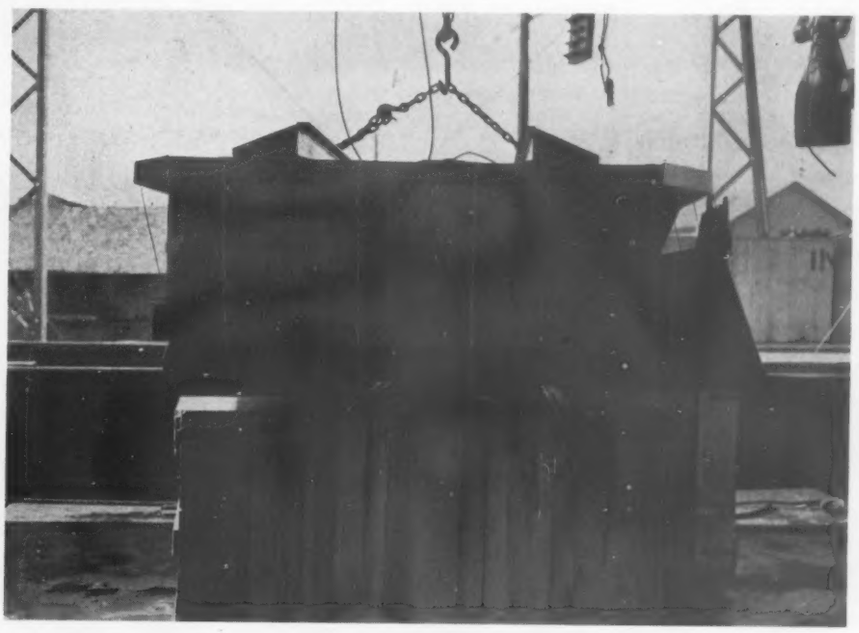
■ RECIPROCAL trade with foreign nations has meant much for exporters of fabricated steel, machinery and equipment. Road graders, automobile trucks, agricultural machinery and other heavy mobile equipment, especially in the automotive line, go far and wide in America's foreign trade. Too little is known about preparation of shipments for such foreign trading. Occasionally there comes to notice an article on shipping preparations such as was written about Chevrolet cars and trucks in the Oct. 11, 1937, issue of STEEL.

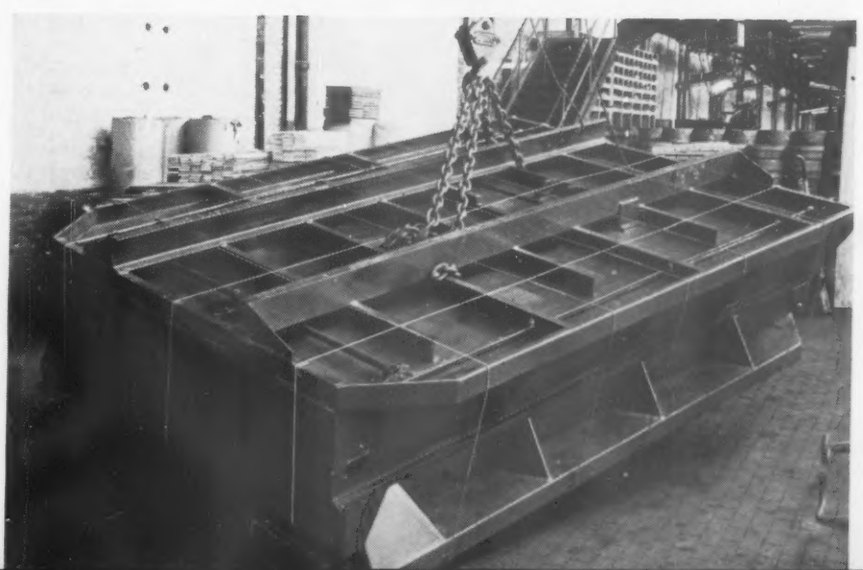
Some American manufacturers are radically changing their shipping methods and in that change, these manufacturers are achieving large shipping economies. One American manufacturer sending steel dump trucks to foreign lands ships the truck chassis in a large wooden case, completely enclosed, with the chassis adequately protected by rust preventatives against ocean air and sea water. These cases are strapped with 8-gage round-wire strapping with a diagonal tie that reinforces the upper and lower edges of the case in 16 different places, thus eliminating that severe torsional strain which is the bane of large export cases.

There is a notable savings where the truck bodies are concerned. Previously these large steel dump-truck bodies were enclosed in wooden crates. Now these wooden crates are eliminated completely and, instead, galvanized wire strapping, that in itself is a guarantee against salt air and salt water, is applied.

Two truck bodies are telescoped with the truck bottoms as the outer surfaces. These then are wire strapped together in a tight and enclosed unit as shown in the accompanying illustrations. Three wires over the ends and five wires over the sides make a rigid, taut protection that saves $16.00 in lumber for the unit. This amounts to $8.00 per truck body on export shipping

(*Please turn to Page* 79)





Upper view shows new and old types of packing for export. The use of wire strapping eliminates crating in many instances. Some units must be completely protected. Others, such as the two dump-truck bodies shown in lower view, are faced together and wired tightly. Bottom rails serve as skids

Making Sucker Rods

Pilot test bars, smooth grain flow forgings, code markings recording history of individual rods, planned handling of rods and closely controlled heat treatment lowers rejects and failures

By R. M. PEASE
Vice President and Manager
Axelson Mfg. Co.
St. Louis

■ Production of sucker rods for oil fields necessitates careful selection, testing and handling of steel, controlled heat treatment before and during processing, and special care in production so that rods are straight with no nicks, cracks or other surface defects from working or handling, which might be responsible for failures in service. These rods are produced in 25 and 30-foot lengths, of four diameters, ⅝, ¾, ⅞ and 1 inch, and in any of four alloys.

Length of rods necessarily requires special heat treating facilities for handling normal production capacity of 1,600,000 feet of rod per month in this plant. The four diameters of four different alloys to meet varied requirements of stress and corrosive conditions in wells further complicates this work.

Sucker rods are coupled together to a total length ranging from less than 1000 feet to as much as 8000 feet for pumping oil wells. Failure of a rod in operation generally entails great expense in fishing and pulling to remove broken rod for replacement. Actual rod replacement is usually a small proportion of total cost. Rods often are subjected to severe abuse in the oil field, over which the manufacturer has no control except educationally.

Ingots Poured Big End Up

Steel ingots for rods are poured in 2½-ton big end up corrugated molds with hot tops. To insure removal of all shrinkage cavities, 20 per cent is sheared from the end of bloom corresponding to top of ingot and 5 per cent from bottom.

In addition to careful laboratory checks and tests of billet and bars at the steel plant, six 8-foot bars from each heat are sent to us for chemical analysis and physical tests before final shipment of heat. If analysis is satisfactory, sample bars are heat treated in an accurately controlled electric furnace at different combinations of normalizing, tempering temperatures and time cycles. Refer to Table I for physical characteristics, chemical analyses and recommendations.

These tests represent range of heat treatment within which the particular analysis for each heat

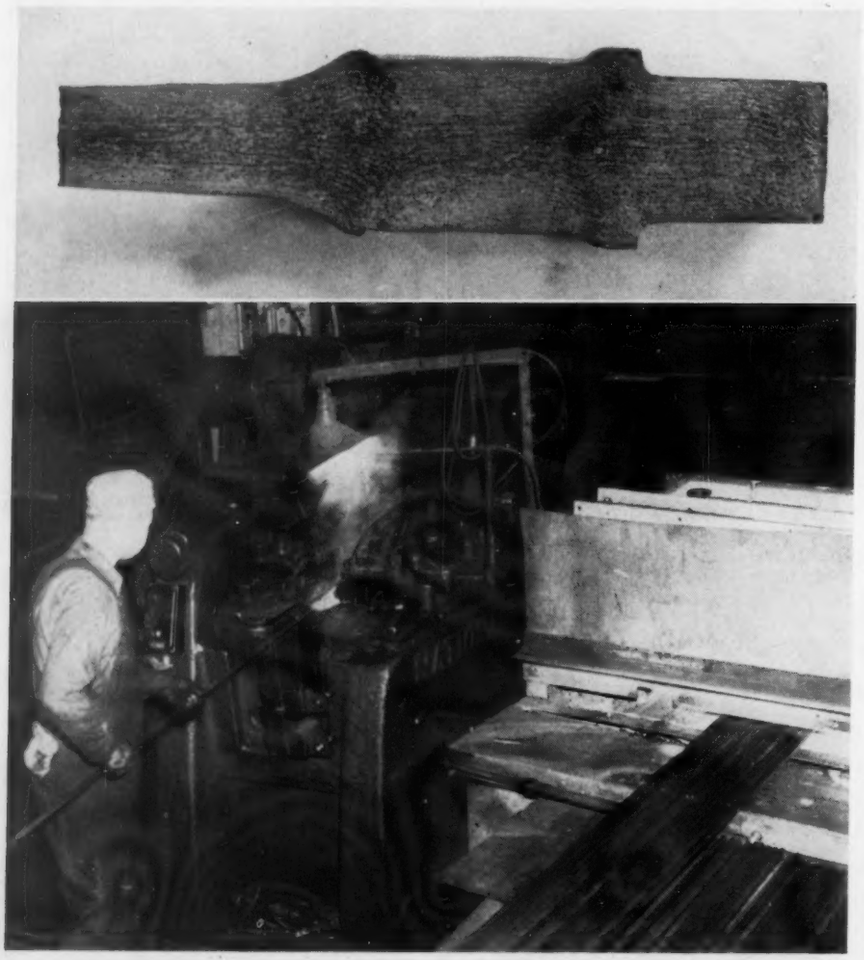


Fig. 1. Grain flow in forging. Sucker rod ends must be carefully upset and forged to maintain unbroken grain flow (Above)

Fig. 2. Forging operation. Specially designed furnace, at right, heats rod ends preparatory to forging and upsetting operations in a series of dies for forming pin ends and wrench squares on sucker rods (Below)

(Above) A battery of 7 heat treating furnaces all lined with B&W Insulating Firebrick. (Left) Exterior of plant, with fleet of modern trucks.

Better Product
Lower Operating Cost
Greater Output

Commercial Steel Treating Corp. of Detroit is using B&W Insulating Firebrick 100 per cent in its heat treating furnaces. Since replacing dense firebrick this company obtains a better product at a lower operating cost, and greater output per furnace.

B&W Insulating Firebrick improve the product, and cut rejections, by promoting uniform heat distribution throughout the furnace. They reduce operating costs and boost output by a marked reduction in starting up time, which means less fuel needed to heat up the furnace and less production time lost while each furnace is being brought up to temperature.

Owners of practically every type of industrial furnace have, like this company, increased overall efficiency by installing B&W Insulating Firebrick. Write for particulars.

THE BABCOCK & WILCOX COMPANY . . . Refractories Division . . . 19 Rector Street, New York, N. Y. R-89

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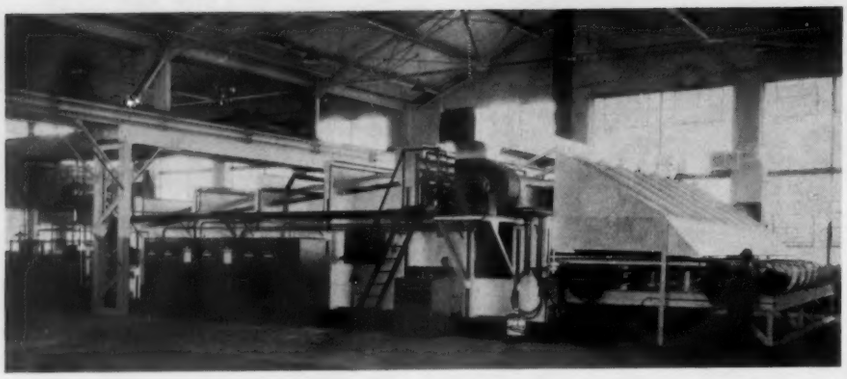


Fig. 3. Discharge end of furnace. Temperature is controlled automatically or manually and recorded in each of nine heating zones. Waste heat from cooling table, right, heats plant in winter

should respond best. That combination which actually produces the best physical and ductile properties for sucker rod service is recorded and determines or "pilots" the particular heat treatment which is to be carried out in actual production of all sucker rods made from that heat of steel.

In addition to analysis specifications bar diameters must be from size to 0.015 inch over and not more than 0.012 inch out of round. Also, bars must not be under specified length nor more than 1 inch over.

Each bundle of bars carries the heat number. Each finished sucker rod is also identified with heat number and other markings in code so that any rod may be traced back to its original source and treatment it received.

Every bar is first run through a bar straightener and checked, then trimmed to exact length. Both ends of bar are forged to provide a square grip for standard wrench and a projecting end to be machined and threaded for coupling. General shape of this forged section and grain flow maintained is shown etched cross section view, Fig. 1.

Careful Upsetting Required

To obtain this smooth grain flow requires careful upsetting. Note particularly freedom from sharp curvature. The part between the two largest diameters of the forged section is for wrench square. To form long taper from bead back of wrench square down to diameter of rod is a difficult and expensive but necessary part of the design. The end at right is threaded and faced for coupling. All of this must be perfectly centered and aligned with axis of bar.

Ends of bars are heated for forging in gas fired furnaces with automatic recording pyrometer control through operation of the valve in the fuel line. Refer to Fig. 2.

Forging and upsetting are accomplished in a series of dies. In the last die, which has final shape of forging, rod is struck three times with a quarter-turn between each forming operation to give accurate finish, size and shape and alignment of forged head to bar. Code letters identifying heat, size, date forged and trademark are stamped on the wrench square.

After both ends of sucker rods are forged and inspected for alignment, entire rod is normalized before machining and threading pin ends for couplings.

Rods Go Through Furnace Sidewise

Designing a furnace which could be used for both normalizing and tempering 25 and 30-foot rods presented a problem. Rods preferably should pass through furnace sidewise with provision for heating evenly the heavier metal at ends and thinner body rods. This necessitates supporting a long roof on furnace.

Other considerations were: Rods must be supported in furnace and kept rolling until cooled so that they would not sag and bend while hot. Oxidation should be kept as low as possible. Perhaps some use could be made of the waste heat. Temperatures and speed of travel through furnace should be variable to take care of particular requirements of different diameters and alloys in both normalizing and tempering but permit close maintenance of the best predetermined temperature and heating cycle, throughout furnace.

The furnace meeting these requirements and costing approximately $60,000 is shown in Fig. 3. Heating zones of this furnace are 32 feet wide inside by 36 feet long with a total overall length of between 60 and 70 feet. Roof trusses supporting the 32-foot span of interlocking flat arch fire brick are protected and insulated.

Normally from 8000 to 10,000 cubic feet of natural gas per hour are used for fuel without special atmospheric control except that obtained by proportioning fuel and air. Furnace has five heating zones under automatic control and four zones under manual control. Temperature in each zone is recorded on charts. Gas burners are of the low-pressure proportional underfired type. One row of 16 burners is mounted below at each end, a duplicate row in middle with another row firing against roof, or a total of 64 burners.

Normalizing temperatures are approximately 1550 to 1650 degrees Fahr., and for tempering from 1000 to 1250 degrees Fahr., according to analysis of the steel. For tempering, rods are passed again through furnace. Furnace temperatures for these operations follow specifications determined in laboratory by pilot tests on original samples for each heat of steel as supplied by bar mill.

To prevent sagging while hot, rods are supported and rolled con-

Table 1

Physical Characteristics

Axelson No.	55	59	60	69
Per Cent Elongation in 8 inches	18	19	19	19
Proportional Elongation	26%	29%	28%	30%
Reduction of Area	45%	65%	58%	67%
Yield Point, lb. sq. in.	56,000	70,000	63,000	70,000
Ultimate Strength, lb. sq. in.	90,000	85,000	90,000	85,000
Brinell hardness	163	166	174	166
Izod—ft./lbs.	40	90	70	100

Chemical Analyses

Axelson No.	55	59	60	69
Carbon	0.40	0.20	0.32	0.13
Manganese	0.95	0.80	1.45	0.80
Phosphorus, Max.	0.04	0.03	0.04	0.03
Sulfur, Max.	0.04	0.03	0.04	0.03
Silicon	0.25	0.25	0.25	0.25
Nickel	....	1.80	....	3.50
Molybdenum	....	0.30	....	0.30

Recommended Service

No. 55—For light to moderately heavy pumping loads, under noncorrosive conditions; should not be stressed beyond 28,000 pounds per square inch.

No. 59—For heaviest pumping with loads up to 35,000 pounds per square inch: resistant to corrosion in mild sulphide oil or salt water.

No. 60—For moderately heavy and heavy wells without corrosion and peak loads not over 32,000 pounds per square inch.

No. 69—For same loading as No. 59 plus resistance to severe corrosive conditions.

tinuously through heating and cooling zones. Rods are pushed forward by projecting fingers on the eight flights of conveyor chain in channels and on supporting rails between each flight. To reduce the extreme variations in temperature separate shorter conveyor chains are used on the cooling table. Conveyor drive is through a variable speed transmission unit varying speed from 3 to 12 inches per minute. When normalizing, time cycle in heating zone ranges from 40 to C0 minutes and for tempering from 1 hour and 20 minutes to 2 hours, as predetermined by pilot test and according to diameter of rods. Fingers on the conveyor chain are spaced 3 inches apart.

To speed cooling, air is drawn through cooling conveyor covered by a hood with two exhaust ducts. During plant heating season one of these ducts discharges into and heats the room. During the nonheating season both discharge into outside air.

After normalizing, several rods are selected at random from each heat and physical tests repeated in laboratory to check physical properties. Test specimens are taken from both bar and forged sections.

Normalizing Scale Removed

Scale from normalizing is removed by passing through a shot blast cleaning machine of continuous type. Rods then are reinspected for defects and straightness. Any bent rods are rerun through the straightening machine and again tempered, shot-blasted and inspected.

Pin ends (at end of forged sections) for couplings are machined and threaded on ram-type turret lathes. After inspecting and checking each rod with gages a thread protector is screwed on to protect threads. Tolerance between "go" and "no-go" gages is 0.003 inch. At final inspection colored bands identifying each of the four types of alloys are painted on rods.

In final assembly a coupling is screwed tight on one end and a shell thread protector on the other. Before applying these, threads are coated with a rust preventive grease and a similar solution applied to the entire assembly. Importance of screwing couplings tight in assembly so they will not loosen in service is shown by fatigue tests which indicate that the joint with a tight coupling is 50 per cent stronger than body of rod while a loose coupling is only 40 per cent as strong as body.

Rods are protected from bending in storage and shipment by ample blocking. When loaded on a flat car, a cat-walk is built so that brakeman does not walk on rods when crossing car.

Powerful Presses Forge Ring Gears

■ FORGING presses of 2000 tons capacity were recently placed in operation in the forge plants of two Detroit automobile manufacturers and are being used in the forging of rear axle ring gears and a variety of smaller forgings in multiples from prerolled blanks. They are the largest yet built by Ajax Mfg. Co., Cleveland. Complete machine, shown in Fig. 1, weighs 260,000 pounds.

Floor Type Planer Used

Construction of these presses required exceptional machine tool capacity, as the frames are integral, one-piece steel castings weighing 100 tons. Planing was done on floor type planers designed and constructed by the builder for its own use. Fig. 2 shows a press frame in position for machining. On these planers the work is bolted to floor plates and the tool carried on a traveling table. Being light in comparison to the work, this table can be reversed with a high degree of accuracy at the ends of the stroke, materially decreasing space required for total clearances.

Designed on the same principle as rolling mill housings, the heavy solid frame sections of these presses make it possible to hold forgings produced to closer limits. On classes of work where only moderate operating speeds are required, presses of this tonnage are built with two-stage reduction gearings. Where higher speeds are specified, in excess of 50 strokes per minute, single-stage gearing is used. In actual production one of these presses with single-stage gearing operated at a rate of 740 strokes per hour, or an average of 12 clutch engagements per minute. Forgings are filled to sharp corners and flash materially reduced.

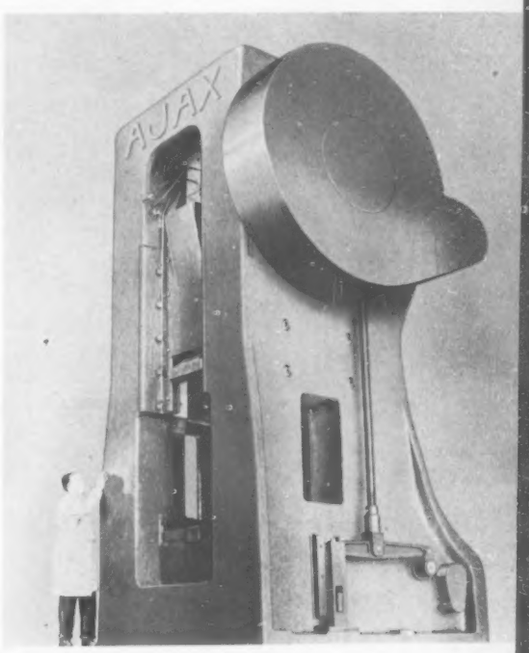


Fig. 1 (Right)—The 2000-ton forging press as it appears completely installed. Fig. 2 (Below)—This press frame, a 100-ton steel casting, is shown in position for machining in a specially designed planer

Forming Elliptical Heads

■ FOR A. O. SMITH CORP., Milwaukee, the flanging department of Lukens Steel Co., Coatesville, Pa., formed eight elliptical heads, each 13 feet inside diameter, 2⅛ inches minimum thickness, and weighing 23,460 pounds. Inside overall depth was 41½ inches and straight flange about 2½ inches.

The steel used was grain size controlled with analysis approximately 0.23 carbon, 0.40 manganese, and 0.04 silicon. For each head, an ingot weighing 54,720 pounds was cast, 90 inches wide, 28 inches thick and 96 inches high. Each ingot was heated separately in the soaking pits to secure proper heating.

After rolling down to 19 inches from their original thickness of 28 inches, ingots were beveled by torch on the edges (Fig. 1), to prevent over-roll or hollow edges, thus insuring maximum width of plate after final rolling.

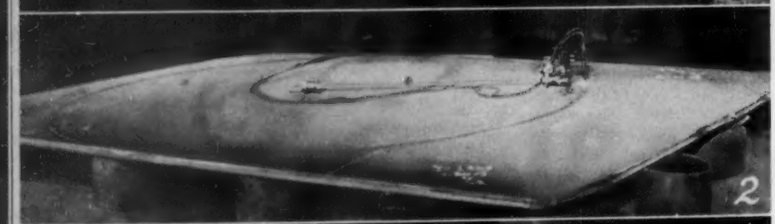
Following removal of the hot tops by flame-cutting, the 19-inch thick slabs again were heated to rolling temperature and rolled into plates 202 inches wide, 215 inches long and 2½ inches thick.

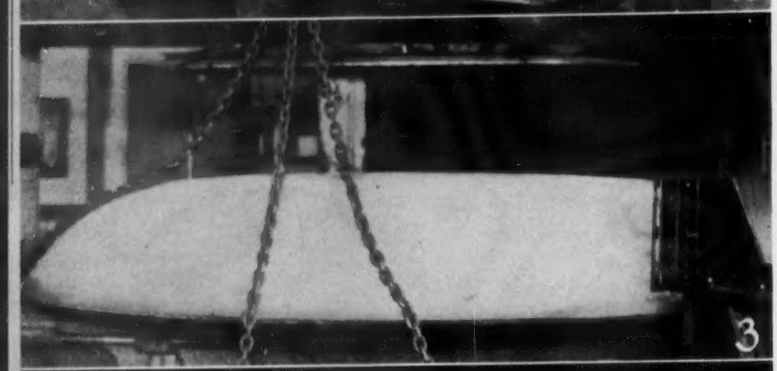
A circular plate was flame-cut, (Fig. 2), measuring 198½ inches in diameter, weighing 23,460 pounds, or about 42 per cent of the weight of the ingot from which the late was roduced.

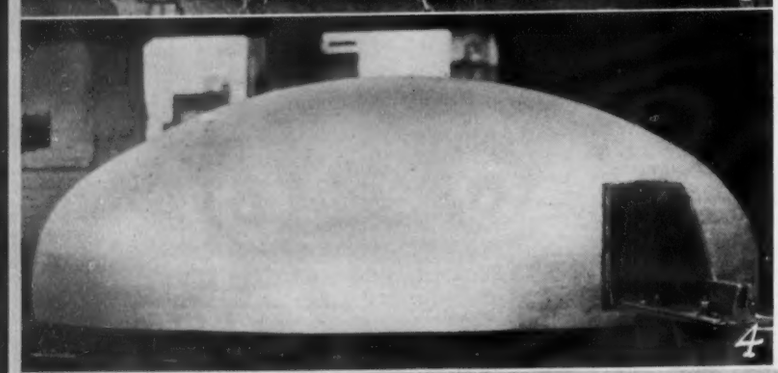
The forming or spinning process consisted of four operations, turn-down, dishing, corner formation and flanging. After heating, circles were given the first forming or turn-down operation (Fig. 3). As the circle revolved at comparatively slow speed of 20 revolutions er minute, the quadrant roller working at various angles from the horizontal towards the vertical gradually forced the outer 20 inches of the circle downward into a skirt.

Circle then was removed from spinning machine and re-heated prior to dishing. In this step, the flat central portion of the head was formed into an elliptical shape by application of vertical pressure, giving head a central elliptical section with radius of 132 inches, surrounded by a flared skirt about 30 inches long. At this point (Fig. 4), spinning was again begun to finish forming of the corner with the quadrant roller forcing the outer edges downward.

Fig. 5 shows the completed coke chambers weighing 275,000 pounds, with 13-foot inside diameter, 61 feet 6 inches overall length, 2⅛-inch wall thickness, designed to operate at 150 pounds per square inch and 900 degrees Fahr.







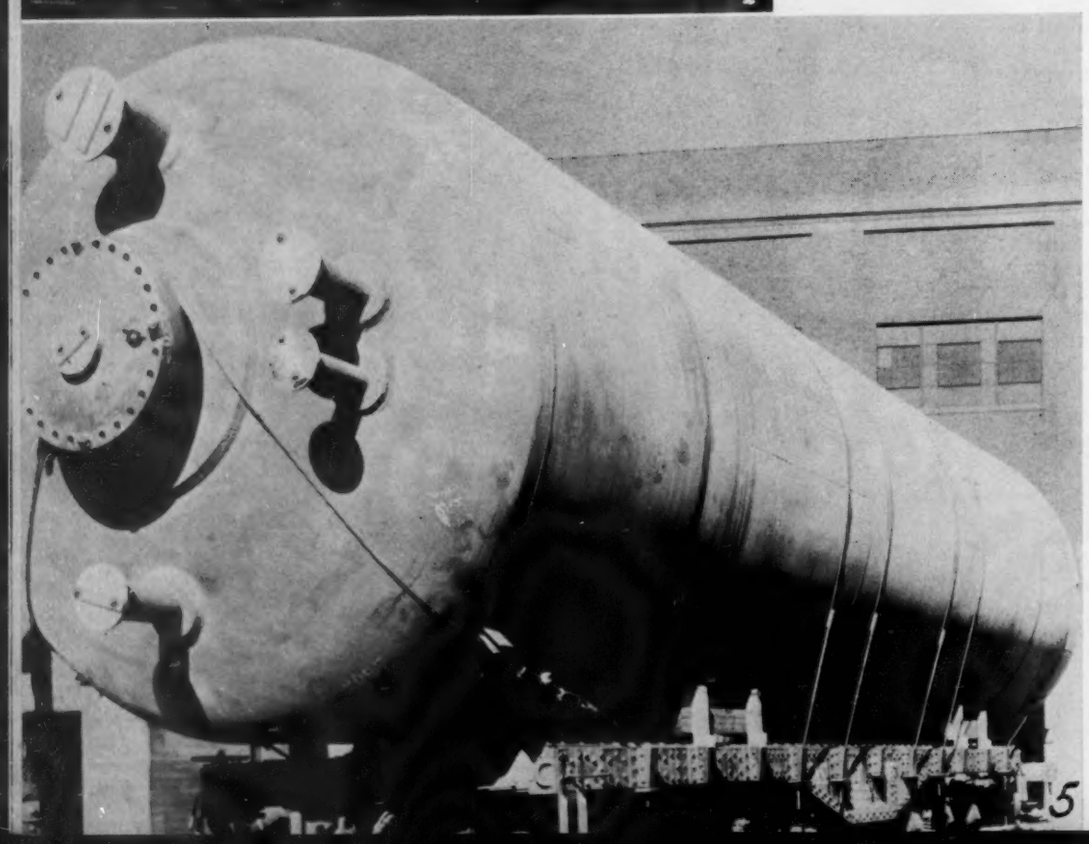


Fig. 1—19-inch ingots beveled by torch to prevent over-roll. Fig. 2—Cutting circle 198½ inches in diameter 2½ inches thick from plate. Fig. 3—First turn down operation at speed of 20 revolutions per minute. Fig. 4—Finished head, edges turned down and central portion turned to elliptical shape. Fig. 5—Complete coke chamber

A.S.T.M. Committees Active In Developing Standards

■ UNPRECEDENTED activity in development of new specifications and revision of existing standards and tentative standards highlighted the forty-second annual meeting of the American Society for Testing Materials in Atlantic City, N. J., June 26-30. The large number of recommendations made by standing committees for society approval reflected the comprehensiveness of the programs pursued by these groups during the past year. A large share of the time of the meeting was devoted to consideration and action on committee reports.

Nevertheless, time was available for presentation of many important technical papers reviewing recent advances in the testing and uses of metals. Among important sessions were four dealing with steel, ferroalloys and effect of temperature; metallography, magnetic testing and radiography; methods of testing; and nonferrous metals. A resume of these sessions is given on these pages. Reports of sessions held early in the week were presented in STEEL for July 3, pages 18 and 40.

New Steel Specifications

A lengthy and important session was devoted to steel, ferroalloys, and effect of temperature. Committee reports commanded the major share of the time, the balance being given over to technical papers.

Committee A-1 on steel has been particularly active the past year, primarily because of the desire to have steel specifications in satisfactory form for the 1939 book of A.S.T.M. standards, but also because several major projects under way for many months have come to fruition, resulting in the proposal of several important new specifications or revised standards. Subcommittee IV on spring steel and steel springs organized a new section to undertake specification work in this field, and subcommittee XXII formed a new group to function permanently in the field of welding fittings for high temperature service.

Reporting for committee A-1, its chairman, N. L. Mochel, metallurgical engineer, Westinghouse Electric & Mfg. Co., Philadelphia, recommended the following proposed specifications for acceptance as tentative: Alloy steel boiler and superheater tubes; electric resistance welded steel heat-exchanger and condenser tubes; carbon steel castings for miscellaneous industrial uses suitable for fusion welding; carbon steel castings suitable for fusion welding for service at temperatures up to 850 degrees Fahr.; and alloy steel castings suitable for fusion welding for service at temperatures from 750 to 1100 degrees Fahr.

The committee recommended and gained approval for the following specifications to be adopted as standard: Steel for bridges and buildings; carbon steel forgings; and high-tensile strength carbon-silicon steel plates for pressure vessels (plates 4½ inches thick and under).

Recommendation was made that the following tentative specifications be revised and continued as tentative: Heat treated carbon and alloy steel track bolts (A 183-36 T); high-strength structural rivet steel (A 195-36 T); seamless steel boiler tubes for high-pressure service (A 192-38 T); and seamless carbon-molybdenum alloy steel pipe for service at temperatures from 750 to 1000 degrees Fahr. (A 206-38 T).

It was recommended that revisions of the standard specifications for boiler and firebox steel for locomotives (A 30-38) be published as tentative for one year before adoption as standard.

Adoption of tentative standards as standard was recommended and approved as follows: High carbon steel joint bar (A 5-36 T); quenched carbon steel joint bars (A 49-36 T); normalized quenched and tempered alloy steel forgings (A 63-38 T); one-wear and two-wear wrought steel wheels (A 186-36 T); carbon steel castings for miscellaneous industrial uses (A 27-36 T); seamless cold-drawn intermediate alloy steel heat exchanger and condenser tubes (A 199-37 T); seamless intermediate alloy steel still tubes for refinery service (A 200-37 T); low carbon nickel steel plates for boilers and other pressure vessels (A 203-37 T); and carbon and alloy steel nuts for bolts for high-pressure and high-temperature service to 1100 degrees Fahr. (A 194-38 T).

Simplification Is Sought

Report of committee A-10 on iron-chromium, iron - chromium - nickel and related alloys, was presented by Jerome Strauss, vice president, Vanadium Corp. of America, Bridgeville, Pa., its chairman. He stated that specifications for bars, tubing, and wire have been delayed for various reasons while specifications for cast and flat products, which have had a tentative status for several years, were being recommended for adoption as standard with editorial improvements and a regrouping into three broad classifications, with a separate specification for the 18-8 chromium-nickel type.

H. H. Morgan, manager, rail and fastenings department, Robert W. Hunt Co., Chicago, reported as chair-

■ Figuring prominently in the annual meeting of the American Society for Testing Materials in Atlantic City, June 26-30, were these five men. From left to right are: H. H. Morgan, the new president; H. F. Moore, Marburg lecturer; R. W. Carlson, Dudley medallist; T. G. Delbridge, retiring president; and C. L. Warwick, secretary-treasurer. For details of the election, lecture and medal award, see STEEL for July 3, page 18

man of the sectional committee on standardization of dimensions and materials of wrought iron and wrought steel pipe and tubing. He said that revision of the American tentative standard for wrought iron and wrought steel pipe (A.S.A. B36.10-1935) which was initiated in 1937 was consummated in 1938 by correspondence. The revised standard was transmitted on Jan. 27, 1939, to the American Standards association for approval as standard.

Committee A-9 on ferroalloys, recommended for adoption and advancement to standard of revised specifications covering ferrotungsten, ferromolybdenum, molybdenum salts and compounds, ferromanganese, ferrovanadium, ferrosilicon. It further recommended that revisions proposed in the standards for spiegeleisen and ferrochromium be accepted for publication as tentative.

Subcommittee 1 reported progress on preparation of standards for ferroboron, ferrotitanium and silicomanganese. Being considered is preparation of a standard for molybdenum compounds other than calcium molybdate. While the latter has been the chief medium of molybdenum additions, new developments in use of molybdenum briquettes and molybdenum oxides as addition agents already has caused a shift of calcium molybdate from first to third place in volume.

Test Forecasts Behavior

A work-brittleness test for steel was described in a technical paper contributed by H. W. Graham and H. K. Work, general metallurgist, and manager of research and development, respectively, Jones & Laughlin Steel Corp., Pittsburgh. Various tests may be used to measure the effect of cold work on the hardness and brittleness of steel, it was pointed out, but most of them are slow and laborious.

The simple test for measuring these properties, particularly the embrittlement on cold working, consists essentially of drawing a tapered specimen through a die, notching it at points representing various increments of cold work, and breaking it in an Izod impact machine. The resultant work-embrittlement curve was said to be characteristic of a given heat of steel. According to the authors, experience over a period of years has shown that the test furnishes useful information as to the probable behavior of the steel during fabrication and service.

The sensitivity characteristic of a steel, determined by the test, has been found to be related to numerous other physical properties. Sensitive steels, it was pointed out, generally exhibit greater fatigue endurance and better machinability than less sensitive steels, while the latter generally show less tendency to become embrittled by cold work. As a consequence, the latter are more suitable for cold forming operations.

Hardenability also has been found to be related to the sensitivity characteristic of a steel, sensitive steels being in general rapid or deep hardening, while insensitive steels are slow or shallow hardening. Heat treatments designed to reduce brittleness and improve toughness, such as normalizing or annealing, are relatively more effective with insensitive steels, while heat treatments designed to increase brittleness, such as blue annealing, are relatively more effective in that direction with sensitive steels.

Adopts New Test Block

History, selection and utilization of the Alloy Casting Research institute test block for heat-resisting alloys were covered in a paper presented by O. E. Harder, assistant director, Battelle Memorial institute, Columbus, O. In this paper, Dr. Harder reviewed an earlier survey conducted by the institute to determine the opinion of foundries and testing laboratories regarding the most suitable type of test specimens for use with heat-resisting alloys in determining high-temperature tensile properties and creep characteristics. He also reported some experiments on use of a pot-type of casting.

Further work at Battelle developed a wedge-shaped test block with a riser along the entire length but gated only at the bottom. The A.C.R.I. technical committee suggested modifying the block so as to introduce hot metal into the head or riser. The A.C.R.I. then proceeded to an evaluation of various kinds of test blocks, including end-headed round, A.S.T.M. B-4 block, keel block, star-gate, U-bar, side-head block and the wedge shape. These various blocks were compared with reference to ease of casting, soundness of specimens, mechanical properties, and relative amount of metal to be melted to produce a given number of specimens.

Dr. Harder reported that the wedge-shaped block which would produce four tension test specimens was adopted on the basis of these requirements. Detailed in the paper was utilization of this block in testing three types of heat-resisting alloys which are usually designated as NC-4, CN-36 and NC-2, or 35 Ni-15 Cr, 25 Cr-12 Ni, 60 Ni-12 Cr.

Physical and corrosion-resistant properties of the nickel-molybdenum-iron and related alloys were discussed in a paper by F. T. McCurdy, superintendent, Haynes Stellite Co., Kokomo, Ind. Equipment for the newer chemical processes is constantly called upon to withstand higher temperatures and pressures and more corrosive reagents, he asserted. Of the problems brought on by these factors, hydrochloric acid corrosion is especially difficult. Until quite recently, few metals could withstand this acid, and then only under mild conditions.

Four strong, nickel-base alloys have now been developed which are suitable, Mr. McCurdy stated. The first withstands hydrochloric acid of any concentration up to 158 degrees Fahr.; the second withstands boiling hydrochloric acid; another wet chlorine at ordinary temperatures. Investigation also has led to a nickel-silicon alloy which is economical for sulphuric acid equipment.

Discussion of this paper centered chiefly around the difficulty experienced in forging these alloys. Mr. McCurdy admitted that forging must be performed within an extremely narrow temperature range, but a technique has been worked out whereby forging is accomplished successfully.

Methods Continued Tentative

Principal report of the joint research committee on effect of temperature on the properties of metals, sponsored by the A.S.M.E. and A.S.T.M., was one of progress. Its chairman, N. L. Mochel, stated that although no criticisms nor comments had been received during the year relative to the tentative method of test for short-time high-temperature tensioin tests of metallic materials (E 21-37 T), the committee recommended that the method be continued as tentative. It was recommended also that the complete revision of the tentative method of test for long-time (creep) high-temperature tension tests of metallic materials (E 22-38 T), submitted last year, likewise be continued as tentative.

Appended to the report of this committee were three technical papers, constituting outlines of progress in current projects. These were: "Report on Torsion Creep Tests for Comparison with Tension Creep Tests on a Carbon-Molybdenum Steel," by F. L. Everett and C. L. Clark, University of Michigan, Ann Arbor, Mich.; "Report on Further Experiments with a Proposed Acceptance Test; Effect of Grain Size," by C. L. Clark and A. E. White, University of Michigan; and "Correlation of Test Results for Various Types of High-Temperature Tests," by E. A. Davis, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

In delivering the fourteenth Mar-

burg lecture on "Stress, Strain and Structural Damage," H. F. Moore, professor of engineering materials, University of Illinois, Urbana, Ill., and past president and honorary member of the A.S.T.M., emphasized that in planning the shape and size of structural and machine members so that they will function without mechanical failure, the designer has to consider the problem of materials from several viewpoints.

These viewpoints, he said, are: What are the magnitudes, directions and length of time and frequency of application of the loads which the part must carry, and how long a life must the part have for satisfactory service; what are the intensities of internal force or stresses, the deformations or strains and the energy represented by the stress-strain relation which must be resisted without injury; and what are the significant resisting properties of various available materials for the part and what is their quantitative value.

Problems Are Complicated

Prof. Moore devoted the greater portion of his lecture to consideration of the following four types of structural damage: Elastic deformation; damage caused by inelastic action; fracture; and damage by continuing deformation and creep. He then described a few of the common tests for determining resistance to structural damage in materials of construction.

Concluding, Prof. Moore stated: "The days of Galileo and his simple assumptions of absolute rigidity, uniform stress, and fracture as the only criterion of structural damage seems delightfully simple, and we sometimes envy him in his ability to develop a satisfactory analysis for the needs of his day without having to worry about elastic strength, fatigue of metals, creep, wear or corrosion. However, we have one consolation. There is no present indication that the knowledge of materials will become so complete that we will lose our jobs for want of work to do, nor that the A.S.T.M. will pass out of existence for the same reason."

Method for Specimens

Metallography, magnetic testing and radiography were considered at one session featuring a number of committee reports and technical papers. Committee E-4 on metallography, reporting through its chairman, L. L. Wyman, General Electric Co., Schenectady, N. Y., recommended a new tentative method for preparation of metallographic specimens.

Thomas Spooner, manager, general division, research laboratories, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., and chairman of committee A-6 on magnetic properties, presented a report carrying several recommendations, including a tentative test method for measuring the lamination factor of steel; a revision in the standard method of test for magnetic properties of iron and steel; and recommendation that the tentative method of test for measuring interlamination resistance of steel be retained on the same basis for another year.

A recommended practice for radiographic testing of castings, and a tentative standard for radiographic examination of castings were offered by committee E-7 through its chairman, H. H. Lester, senior physicist, Watertown arsenal, Watertown, Mass.

At this point, the session split into two sections, one section concerning itself with metallography and magnetic testing, the other with radiography. In the former, W. B. Mechling and S. S. Jack, California Institute of Technology, Pasadena, Calif., contributed a paper outlining some mechanical tests on aluminum alloys 14S-T and 24S-T.

First alloy was in the form of a large hand-forged billet and 24S-T as a ¾ x 6-inch rectangular bar. In addition to determination of the usual mechanical properties, tension impact value were obtained. It was found that results compared favorably with the generally accepted mechanical properties of the alloys. Considerable variation of mechanical properties with grain direction was found.

Increasing application of magnetic analysis in testing all types of steel of uniform cross section was reported in a paper by Theodor Zuschlag, chief electrical engineer, Magnetic Analysis Corp., Long Island City, N. Y. Following a discussion of the historical developments of magnetic methods for inspecting bar stock and pipe, the author described apparatus now generally used, and discussed some of the practical problems encountered in the work.

Before the radiography section, D. M. McCutcheon, Ford Motor Co., Dearborn, Mich., contributed a paper on use of radiography in development of castings for mass production. The author stated that the number of cast parts being used in the modern automobile constantly is increasing. For example, in February the Ford company used 7000 tons of copper-silicon steel castings alone.

Pilot Castings Radiographed

In replacing other types of fabrication with castings, it was asserted, it is necessary to show a manufacturing advantage, and the castings must possess the necessary strength and other physical properties. In development work, radiographic examination is used with pilot castings to determine the most economical foundry procedure that will produce sound castings. Describing the procedure in making the examinations, Mr. McCutcheon pointed out that radiographic examination is not used in regular inspection of castings.

An interesting study that may point to future trends was presented by T. A. Triplett, X-ray metallurgist, Triplett & Barton, Burbank, Calif., and W. L. Howland, California Institute of Technology, Pasadena, Calif., in a paper discussing correlation of some mechanical tests of aluminum alloys with X-ray tests. Both cast and forged materials were studied to find the difference in mechanical properties with what was called radiographic quality.

Results showed that certain correlation was obtained between non-

■ **Here is shown one section of the exhibit of testing apparatus and related equipment conducted during the annual meeting of the American Society for Testing Materials. Represented among the 40 exhibitors were 26 equipment manufacturers; several commercial, government and university testing laboratories; and 9 A.S.T.M. standing committees. This was the fifth exhibit sponsored by the society and the first in Atlantic City**

destructive X-ray tests and destructive mechanical tests. Material judged good or poor from radiographic tests, when compared with dynamic tests, showed a greater difference than when compared with static tests.

H. H. Lester contributed a comprehensive discussion on some aspects of radiographic sensitivity in testing with X-rays, citing considerable work on this subject.

Results of attempts to determine how narrow an internal crack in a metal can be revealed reliably when a radiant source of very small diameter is used were reported by Prof. G. E. Doan and Milton B. Vordahl, Lehigh university, Bethlehem, Pa. Employing a radiant bulb approximately 1/16-inch diameter, the investigators found that cracks 0.001-inch wide in blocks of steel 1-inch thick gave distinct registry. In 2-inch, 3-inch and 4-inch blocks, limits of crack width were 0.002, 0.003 and 0.003 to 0.004-inch, respectively. Cracks of that fineness would probably escape detection with sources of the usual dimensions, it was stated.

Improves Testing Methods

Two committee reports and six papers dealing with test data featured the session on methods of testing. Report of committee E-1 on methods of testing, presented by its chairman, W. H. Fulweiler, consulting chemist, Philadelphia, proposed a revision in the tentative standard for test for softening point by tapered ring apparatus. The committee also recommended adoption as standard of tentative standards for sieves for testing purposes; and the bend test for ductility of metals.

Development of a theoretical method for correcting the apparent Rockwell hardness numbers obtained on cylindrical specimens using the ball penetrator was described in a paper by W. E. Ingerson, technical staff, Bell Telephone Laboratories Inc., New York. Deviation of apparent from true hardness was found to vary approximately linearly with the depth of impression for a given specimen diameter. Variation in apparent hardness measured on flat and curved surfaces was found to check the theoretical difference, in general, closer than 0.5 of one Rockwell number.

In a second paper, Mr. Ingerson and R. L. Peek Jr., also a member of the Bell laboratory technical staff, presented an analysis made with Rockwell data to correlate readings made with different loads and ball diameters, and to simplify the relation between hardness and tensile strength measurements. The investigation indicates the possibility of calibrating the Rockwell tester with a single test block, using various loads and ball diameters. The study showed the possibility of setting up specification limits for hardness measurements corresponding to tensile strength limits.

A paper by Glenn Murphy, associate professor of theoretical and applied mechanics, Iowa State college, Ames, Iowa, described a method for presenting on a single diagram the stress-strain relationships for varying rates of loading, the strain-time relationships for varying stresses, and the stress-time relationships for varying strain. This gives the behavior of the material under any combination of stress, strain or time. Properties of the material, such elastic strength, ultimate strength, resistance to impact loading, and creep limit for various amounts of total deformation also may be evaluated from the characteristics of the diagram.

Further experiments on the effect of velocity in torsion impact testing of hardened 1.10 per cent carbon tool steel were reviewed in a paper contributed by O. V. Greene and R. D. Stout, metallurgical department, Carpenter Steel Co., Reading, Pa. A range of speeds on the torsion impact machine and on the static torsion machine was investigated. Results indicate that the torsion impact test is essentially a rapid static test.

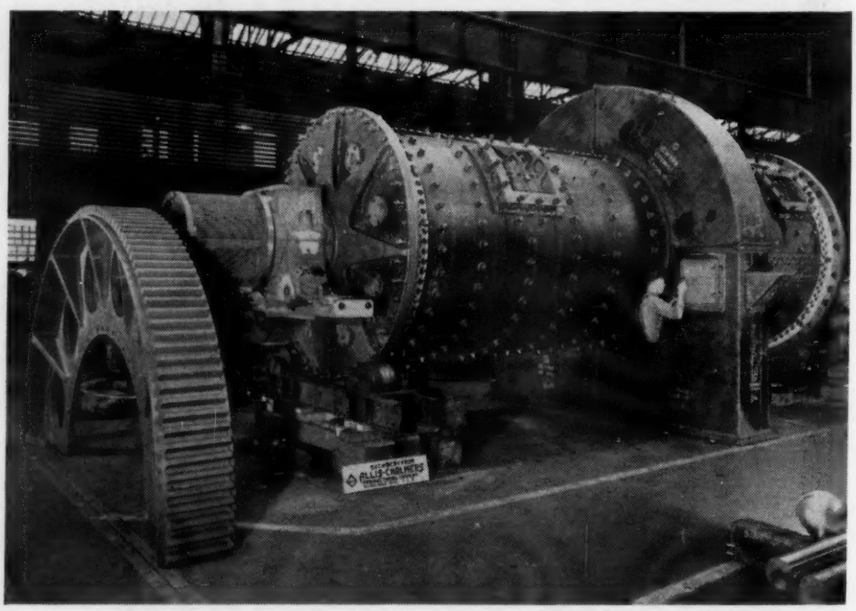
Evolution of weighing systems, from the early balances of ancient civilization to the devices of the present time was traced in a paper "Load-Weighing and Load-Indicating Systems," by C. H. Gibbons, technical advisor, testing machine division, Baldwin-Southwark Corp., Philadelphia. Development of alternative devices for purposes of load evaluation, particularly those of the past 70 years, was covered.

Nonferrous Committees Active

Committee reports highlighted the session devoted to nonferrous metals. Reports included the following: Committee B-1 on copper and copper alloy wires for electrical conductors; committee B-2 on nonferrous metals and alloys; committee B-4 on electrical heating, electrical resistance and electric furnace alloys; committee B-5 on cast and wrought copper and copper alloys; B-7 on cast and wrought light metals and alloys; E-2 on spectographic analysis; and committee E-3 on chemical analysis.

New tentative specifications proposed by committee B-5 cover: Leaded brass sheet and strip; copper-nickel-zinc alloy sheet and strip; beryllium-copper bars, rods, sheet, strip and wire; copper-base alloy forging rods; leaded nickel brass and leaded nickel bronze ingot for sand castings; and tentative classification of cast copper-base alloys. Numerous revisions to standards

Big Mill to Be Used in Making Refractories



■ **A compeb mill that will be loaded with 85,000 pounds of forged steel grinding media was included in grinding and screening equipment recently shipped to Basic Dolomite Inc., Maple Grove, O., by Allis-Chalmers Mfg. Co., Milwaukee, for use in manufacturing a new line of high magnesia refractories. This mill, shown above, is 22 feet long and 8 x 7 feet in diameter, and has a first compartment that will operate in closed circuit with 4 x 6-foot vibrating screen. A 450-horsepower, 4000-volt synchronous motor drives the mill**

and tentative standards also were proposed.

The report included a paper "Nomenclature and Classification of Cast Copper and Copper-Base Alloys," by Sam Tour, vice president, Lucius Pitkin Inc., New York. Mr. Tour outlined the confused situation in classification of nonferrous alloys, and discussed work done to provide the classification of foundry alloys presented in the tentative classification by the committee.

The classification includes in the term "copper" all alloys containing 98 per cent or more copper, in the term "brass" all copper-base alloys containing an appreciable amount of zinc, and in the term "bronze" all copper-base alloys containing alloying elements other than zinc and in sufficient amounts to be predominant over zinc in the alloy.

A second paper in the report was "Service and Life on Nonferrous Tubes in Petroleum Refining," by E. S. Dixon, metallurgist, Texas Co., Port Arthur, Tex. This covered problems faced by the oil refiner in finding a suitable metal or alloy for use in shell and tube-type heat exchangers.

Causes of Tube Failures

Mr. Dixon pointed out that red brass fails from water pitting, but not from dezincification to the same extent as admiralty metal, and its high copper content makes it readily corroded by sulphides in the distillate. Some improvement with respect to dezincification has been noted when arsenic is added to the tube alloy, but a number of such tubes failed by cracking. Value of antimony and phosphorus has not been determined.

Report of committee B-6 included a paper on magnesium alloy die castings by A. W. Winston, Dow Chemical Co., Midland, Mich. The author pointed out that while magnesium alloy die castings have been produced here since 1931, considerable trouble was encountered with goose-neck type machines. These problems were largely eliminated, however, with introduction of cold-chamber machines in which the metal is ladled by hand and the shot made at a pressure up to 4000 pounds per square inch.

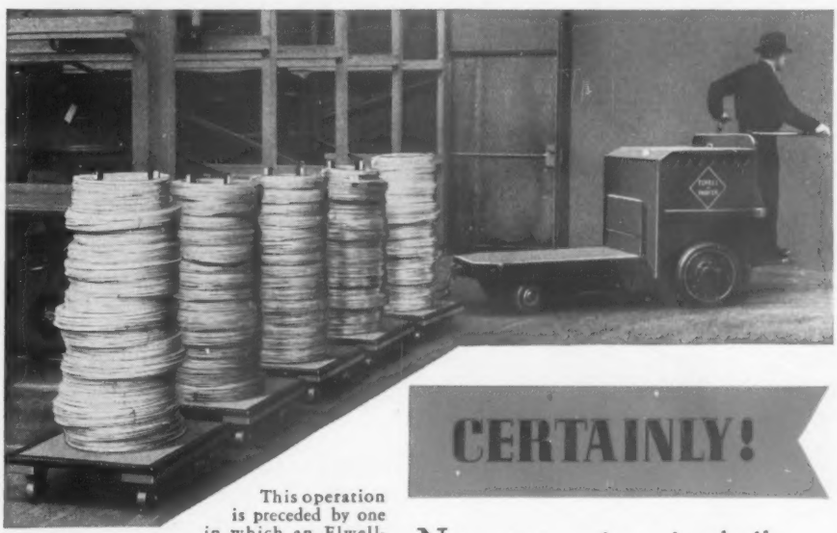
Metal is melted in a separate furnace protected from oxidation by sulphur vapors, Mr. Winston said. Metal pouring temperature is from 1175 to 1250 degrees Fahr., the die temperature running from 250 to 500 degrees. Castings up to more than 200 square inches in projected area and up to 74 inches in length have been made. Several alloys are available, but most are made from A.S.T.M. alloy No. 13.

Report of committee B-7 on cast and wrought light metals and alloys submitted tentative specifications for aluminum-base alloys in ingot form for die castings; aluminum alloy ingots for remelting; and aluminum for use in iron and steel manufacture. Revisions were recommended in tentative specifications for aluminum alloy (duralumin) sheet and plate; aluminum alloy (duralumin) bars, rods and shapes; magnesium-base alloy ingot for remelting; and aluminum-magnesium-chromium alloy sheet and plate.

Power Line Protection

■ Complete one-cycle protection from ground and phase faults by use of a single relay at each end of the line is provided by a high-speed differential pilot-wire relay system developed by Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. The new system uses only two pilot wires and requires no batteries. Fault currents are passed through a phase-sequence network in a single relay and produce an alternating voltage that is transmitted over pilot wires. Because the transmitted quantity is alternating, prevention of excessive induction is simplified. The relay itself uses small rectifiers of the disk type.

"Give a Lift" every time your materials move ahead



This operation is preceded by one in which an Elwell-Parker *Fork* Truck delivers special containers of coiled wire from boxcars, and tiers them high in warehouse racks shown in background. When taken from storage, coils are reloaded and hauled on dollies by *Lift* Truck, used, among other purposes, as a tractor.

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Many Countries Participate in International Foundry Congress

■ WORLD-WIDE representation featured the seventh International Foundry congress in London, June 12-17, with the Institute of British Foundrymen as host. Attendance was over 600 with 200 of these coming from 20 countries scattered over both hemispheres. For the first time in history of the institute, full government recognition and participation were given to the congress.

Largest delegation came from France, with 54 representatives headed by J. Lobstein, president, Association Technique de Fonderie; A. Brizon, past president; and Prof. Albert Portevin, internationally-known metallurgist.

The American Foundrymen's association was represented officially by Past President W. R. Bean, vice president, Whiting Corp., Harvey, Ill.; and Dr. H. A. Schwartz, manager of research, National Malleable & Steel Castings Co., Cleveland. Others present were G. W. Cannon, vice president, Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich.; and C. R. Austin, professor of metallurgy, Pennsylvania State college, State College, Pa.

Representation of Countries

Representatives from other countries numbered as follows: Germany 27, Hungary 21, Belgium 17, Poland 16, Italy 15, Norway 12, Denmark 9, Holland 9, Sweden 7, Australia 4, South Africa 4, Czechia 2, India 2, Switzerland 2, Luxemburg 1.

W. B. Lake, governing director, Lake & Elliot Ltd., Braintree, Essex, was elected president of the Institute of British Foundrymen at the annual meeting of the organization on June 12. Major R. Miles, Teesdale Ironworks, Thornaby-on-Tees, was named senior vice president; and D. H. Wood, managing director, Constructional Engineering Co. Ltd., Birmingham, junior vice president. Tom Makemson, Manchester, was reappointed secretary. Report of the council revealed that the institute reached a record high with 2307 members on April 30.

Official opening of the congress was at the Dorchester hotel, June 13, with J. Hepworth, director, Bradford Piston Ring Co. Ltd., Bradford, and retiring president of the institute, presiding. Dr. Guido Vanzetti of Italy, president of the International Committee of Foundry Technical associations, emphasized the need of scientific knowledge and experience, without which the industries of progressive nations cannot reach sure and practical results. He stated that a research and test laboratory is a necessity to a modern industrial works, but that, at the same time, scientists must aim at effecting the practical application of their researches and discoveries.

He stressed importance of co-operative work, and said periodical meetings such as the present one helped to avoid duplication of work and waste effort due to exaggerated individualism. Knowledge should be shared, he emphasized.

The Oliver Stubbs gold medal was presented to J. G. Pearce, director, British Cast Iron Research association. The institute's Meritorious Services medal was awarded to J. E. Cooke, for many years until recently secretary of the institute's Lancashire branch.

The E. J. Fox gold medal was presented to Dr. H. A. Schwartz. This medal is awarded annually to a person of any nationality who is distinguished in foundry practice and science and in metallurgy, and Dr. Schwartz is the first non-British recipient. Sir Frank Bowater, the Lord Mayor of London, in recognizing Dr. Schwartz, said that this award was made to one who is esteemed throughout the world for his scientific work in developing malleable cast iron. In accepting the medal, Dr. Schwartz expressed thanks and mentioned that Prof. T. Turner was the first European to receive an A.F.A. medal.

In his presidential address, Mr. Lake gave a comprehensive historical review of the history of steel castings. At the conclusion he emphasized that developments in steel foundry practice resulted from the work of scientists and practicians from many industrial countries.

Presents Williams Lecture

The opening session was closed with the fourth Edward Williams lecture on "The Atomic Pattern of Metals," by Prof. W. L. Bragg, Nobel laureate, director, Cavendish Laboratory, University of Cambridge, who has devoted many years to study of the atomic structure of metals.

During the lecture, Prof. Bragg had mentioned the occurrence of weak links in certain atomic chains in the structure of metals. In his conclusion, he drew attention to weak links in the chain between science and industry. On the one hand, many scientists still keep aloof from the practical side of their studies, and on the other hand, industrialists are not sufficiently prone to understand the scientist's language or to share his viewpoint sympathetically. All efforts should be made on both sides to make stronger the bond and the understanding between them.

Technical organizations from 13 countries, including the United States, were represented at a meeting of the International Committee on Testing Cast Iron. J. E. Hurst, past president of the institute, and Prof. Portevin, honorary president of the committee, directed the meeting.

Principal social event of the congress, the banquet on June 14, assembled about 550 guests. Oliver Stanley, president of the board of trade and chief speaker, emphasized importance of research work, in which the Institute of British Foundrymen plays such a great part. He paid tribute to co-operation that exists between foreign countries, as illustrated by the congress, a co-operation that extended to the exchange of knowledge of human beings, and said that to understand each other was to take the first and perhaps the longest step toward peace.

International Committee Elects

Meeting of the International Committee of Foundry Technical associations took place on June 16 with President Vanzetti as chairman. Dr. Schwartz, Past President Bean and Vincent Delport, European manager of STEel, represented the American Foundrymen's association. A calendar of future international congresses was adopted as follows: Italy in 1940, Holland in 1941 and United States in 1942. J. Lobstein, president, Association Technique de Fonderie of France, was elected president of the committee for 1940, and Hungary was designated to nominate the vice president.

Thirty-eight papers, covering practically every subject connected with the casting of metals, were presented during the congress. Nine of these papers were official exchange papers contributed by the technical associations of Belgium, Czechia, France, Germany, Holland. Hungary, Italy, Poland and the United States. F. A. Melmoth, vice president, Detroit Steel Casting Co., Detroit, presented the paper submitted on behalf of the American Foundrymen's association, subject of the paper being "Renaissance of the Steel Casting and the Role of the Metallurgist."

During the congress, visitors made numerous visits to industrial plants in the London district. A post-congress tour took a large party to Birmingham, Derby, Sheffield, Manchester, Glasgow, and Edinburgh.

ADVERTISING PAGES REMOVED

Adequate Ventilation

(*Concluded from Page* 53)

mer. It causes steel stock to rust. Where ventilation was adequate, air movement was formed to absorb moisture, largely solving the rust problem.

Control of atmospheric dust is a part of ventilation. Use of air filtering equipment to remove objectionable substances from the atmosphere is gaining usage in steel mills and metal working plants. Soot, dust, siliceous matter, flyings and other air-carried matter harmful to workers and machinery may be eliminated with filters. Atmospheric dust is probably worse in summer because windows are opened, bringing in outside flyings. Filtered air ventilation often is limited to certain buildings or departments where cleanliness is a factor, such as office buildings and laboratories.

Process Dust Easily Removed

Process dust, different in composition than atmospheric dust, is eliminated easily with a dust collection system at the processing source. This may consist of a hood, duct, exhauster and sometimes a container to trap the residue for salvage or disposal. In some plants, the cleaned air is recirculated after going through a separator. If residue contains odors, fumes or harmful ingredients, recirculation is not recommended and sometimes is illegal.

Frequency changers and other electrical equipment used in steel mills must be cooled to maintain maximum operating efficiency. In some mills, the air is being filtered before flushing the equipment internally. With large motors, ventilation reduces upkeep, gives greater efficiency, eliminates costly breakdown.

One mill installed filtered air ventilation for a frequency changer, investing $7500, and saves $8500, or approximately 115 per cent, on the investment annually. This filter removes more than 200 pounds of dirt per year, a load of grit that formerly played havoc with operating costs and maintenance.

Managements report that filters increase the life of air compressor valves 200 per cent, reduce valve cleaning 90 per cent, decrease oil consumption 35 per cent, and cut wear on cylinders, pistons and bearings in half.

Adequate ventilation in drying rooms keeps operating costs on metal finishing operations at minimum. They are especially important in the summer when high humidity conditions may seriously interfere with normal drying.

Bad co-ordination was the most deficient factor in winter ventilation as it often did not function properly with the heating system. Sometimes, the units by themselves were adequate. At other times, they were "haywire." Unless properly geared, ventilating as well as heating equipment will give substandard performance. Exhaust systems in some mills sucked in annoying infiltrations of cold air to replace air discharged, creating worker discomfort and bludgeoning production. To remedy this condition, heated air should be introduced and distributed evenly to offset the drafts caused by exhausted air. In some mills, unit heaters do this satisfactorily.

Certain mill superintendents reported that exhausters functioned badly in cold weather. Investigation disclosed that, in an effort to maintain workable temperatures, little or no air was admitted to the building. As a result, the exhaust system could not get air. The variable temperature unit heater is one modern solution to this problem. Attached to a duct extending outside and equipped with recirculating dampers, fresh air is brought in as needed and warmed simultaneously, thus preventing a vacuum being pulled in the building and maintaining efficient operation of exhausters.

In one mill, a blast coil was installed in a window frame, serving as an effective vacuum breaker. This coil tempered the fresh air supply as it came from the outside, saving the exhaust fans from air starvation.

Heat Incoming Air

In cold weather, provisions must be made for heating incoming air to maintain the required indoor temperature. In some plants, we found that the heating systems, adequate before exhausters were installed, now operate inefficiently because they are not equipped to heat the replacement air properly. Consequently, the buildings are always cold, unevenly heated or drafty. One reason why heating and ventilating systems do not co-ordinate properly is that exhausters and other devices have been added from time to time to meet changing demands but the heating systems have been left "as is."

Check and lubricate fans and blowers regularly. Fan trouble caused by dirt and vapors entering motors and bearings is costly. When fans without ducts are used for exhaust or supply, they should be installed so a strong wind does not blow back the air into the plant to plague workers with drafts. Protect fans with guards to prevent accidents.

Where motors were installed inside the ductwork, managers frequently reported damage from dust, heat, moisture and vapors. Acid fumes are hard on ducts and motors. In some cases, fires occurred because the air mixture was inflammable and sparks from a defective motor started a blaze. To minimize such hazards, motors in other mills were installed outside the ductwork, easily accessible for cleaning, too. Replacement of ductwork ran high in some mills due to corrosive action of gases or vapors passing through it. Duct material had not been carefully selected.

Corrosion resisting metals of high nickel content help minimize ductwork depreciation. Some managers reported that ductwork went bad in three or four months, necessitating replacement. Proper duct materials will minimize duct maintenance.

One mill manager uses a special rubber coating providing a tough protective film against corrosion. Galvanized sheet metal was found satisfactory in some mills after treatment with an asphalt-base corrosion-resistant paint inside the duct or hood.

Ventilation in the steel mill or metal working plant serves four worthy purposes: To cool an interior for worker comfort and mechanical efficiency; to purify the air contaminated by breathing; to remove industrial fog, fumes, dust and other obnoxious discharges of processing; and for safety.

Obviously, equipment as versatile as this should be utilized fully because it can be a boon to profits. From our field work on summer and winter ventilation, we recommend that mill managements authorize a competent check-up of their ventilating systems immediately. Adequate modernization of such equipment will aid production, cut costs and increase profits.

Thin-Wall Crucibles

■ Before new alloys can be produced or existing ones improved, it is necessary to determine the properties of metals in a pure state. The nature of the crucible in which the metal is melted is of fundamental importance, since contamination may readily occur if it is made of improper material. From several of the refractory oxides, and using the "slip-casting" method similar to that used in ceramic work, the metallurgy division of the national bureau of standards, Washington, has made crucibles with very thin walls possessing high mechanical strength, hardness and resistance to thermal shock. By suspending the finely ground particles of the refractory in absolute alcohol instead of water, magnesia crucibles have been produced for the first time by slip casting.

Mirrors of Motordom

(*Concluded from Page* 40)

washers, Mr. Danse examined some of these track washers, made with a small lip on the inner rim which bites into the metal it bears against. After some testing, a modified version of the railroad washer was perfected. Surfaces are smooth, but a cross section presents a stub-bottomed inverted V.

Cadillac's works manager, V. A. Olsen, in commenting upon the development, says, "Lock washers are low in cost and our percentage of failure was slight. However, an automobile like the La Salle uses 300 such washers. Multiply this figure by the industry's unit output and the consumption runs into millions. If we have eliminated even the occasional handling failure we have contributed something to manufacturing progress."

In the use of lock washers, there is usually met the troublesome problem of retaining the washer on the bolt prior to placing it in the assembly. Such washers drop off easily and where thousands of them must be handled hourly, an inordinately large amount of time is occasionally spent in replacing washers onto bolts. A simple solution, worked out by an eastern supplier, involves the use of a small paper washer with a hole slightly smaller in diameter than that of the bolt. This washer is forced on over the bolt after the lock washer has been put in position and restrains the steel washer from falling off; when the bolt is tightened up, the paper washer is virtually crushed and in no way interferes with the action of the lock washer.

There are a number of other ideas for holding lock washers onto bolts, of course. One is to roll a groove in the bolt shank just under the head to hold the washer which is put in position before the threads on the bolt are rolled. Another is to form a shoulder on the bolt shank and then swedge the washer over it. The paper washer idea is new and, simple as it sounds, impresses some of the bolt people as being an effective solution to an annoying problem, especially in the automotive industries where time is at a premium.

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Machinery's Handbook In Tenth Edition

■ *Machinery's Handbook,* tenth edition 1815 pages, 4½ x 7 inches; fabrikoid; published by The Industrial Press, New York; supplied by STEEL, Cleveland, for $6; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London S.W. 1.

This is the most complete edition of the handbook ever published, containing 250 pages more than the ninth edition. Among new features are standard mounting dimensions, with horsepower and speed ratings for different types of motors British standard limits and fits for holes and shafts American standard for different gages selection of tool steels for different classes of tools; additional data on various screw thread standards; tables for checking gear sizes by the pin and chordal method of measurement; standard grinding wheel shapes and dimensions; standard forming tool blanks; standard tolerances for forging; American standards for drawings and standard abbreviations and symbols; selection of lubricants for bearings; standard V-belt drives; new hardness conversion tables; checking screw thread sizes, and numerous other new subjects.

The general character of the volume is similar to that of preceding issues, containing many standard features not subject to change. The complete book contains 134 main divisions.

Exporting Trucks

(*Concluded from Page* 63)

expense. This saving is largely in the lumber plus reduced packing time involved.

The two heavy channels on the bottom surface of each truck body act as skids, avoiding any need for heavy wooden members. Note that wire binders are always well protected, passing under these large longitudinal channels which serve as skids. In addition a further important economy is realized because of the reduced cubic displacement required. This allows more space in the cargo vessel and results in cheaper rates for shipping the dump truck body unit.

Unseen in this unit are the hoists which are situated in the rear of each cab and which are used to lower and raise the dump-truck bodies by mechanical means. These hoists are fastened within the units so that the two hoists and two dump truck bodies are one integral unit secured with wire. With hoists well-secured inside and wire-tied truck bodies, rigidity is assured, and there is no sway or possibility of any of the members being pulled out of line.

The larger unit shown on the floor is a type used on the island of Madeira. The unit resting on the wooden case (finished case beyond to the right rear being wire strapped and ready for shipment) is stencilled for Mollendo, Peru.

Wire is rapidly replacing wood in this industry for bracing, strapping and stowage purposes. It has the happy faculty of possessing enough tensile strength to absorb shocks and strains yet it still holds its loads tightly and rigidly.

♦

Dust Control Group Is Offering Assistance

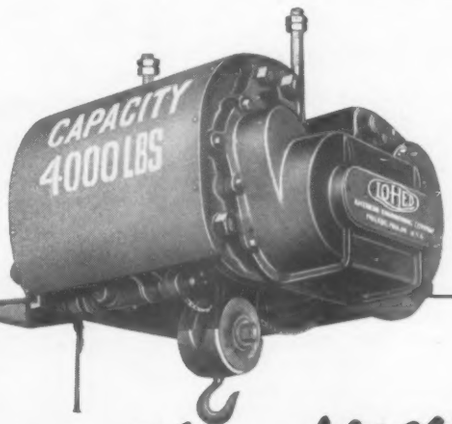
■ Dust Control Equipment association is continuing to offer its assistance to groups interested in eliminating dust hazards. Most recent activity was a presentation to woodworking machinery manufacturers of the services available from the association's engineering committee. Included was a statement of tentative exhaust requirements consisting of minimum branch pipe connections and suggested hoods, some 14 in number.

Prior to this, manufacturers of grinding machines were contacted with an offer of assistance. Another important activity of the engineering committee is assisting all manufacturers to furnish buyers of their particular machinery with the best in the way of modern methods and procedures when installations of dust control equipment are involved or are being contemplated.

John Hellstrom, vice president, American Air Filter Co., Louisville, Ky., is president of the Dust Control Equipment association; S. S. Parsons, president Parsons Engineering Co., Cleveland, is vice president; and Arthur J. Tuscany, Tuscany, Turner & Associates, Penton building, Cleveland, is executive secretary.

Electro-Tinning Guide

■ "Electro-Tinning," a brief handbook of working instructions compiled by S. Baier, discusses analytical methods of control, advantages and drawbacks of sodium stannate, stannous chloride-caustic potash, stannous ammonium oxalate and acid tin-plating baths as well as stannate bath with insoluble anodes, to enable the most satisfactory type to be chosen for any specific purpose. It is shown that none of the apparatus required is expensive or complicated, and if instructions given are adhered to, satisfactory results should be within the reach of all. This handbook, publication 92, may be obtained free from International Tin Research and Development Council. Fraser Road, Greenford, Middlesex England.



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- 100% positive automatic stop.
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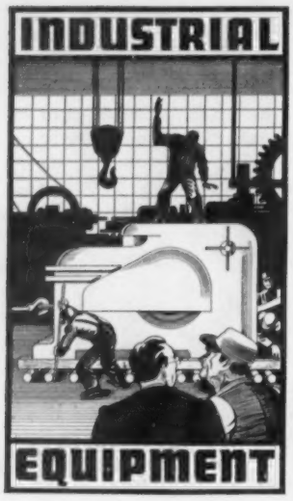
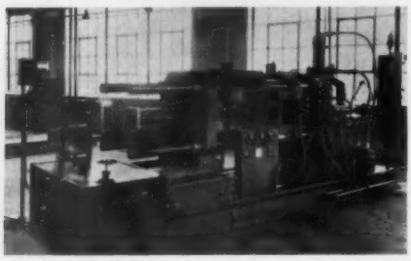


Die Casting Machine

■ Dycast Products division of Monarch Aluminum Mfg. Co., Detroit avenue and West Ninety-third street, Cleveland, announces pressure die casting machine, model 200, capable of 600 shots per hour. Die plates are 24 x 24 inches from center to center of bars and 20 x 20 inches between bars. Die opening is 12 inches. Die space ranges from 32 to 12 inches. Pressure per square inch on metals reaches 6000 pounds for zinc and 16,000 pounds for aluminum and brass. Locking pressure is 250



tons. Simplified design permits installation of new pot and gooseneck within ½-hour. Flow of water through all water lines is visible to operator. Gooseneck and plunger arrangement permit dispensing a variable amount of zinc alloy without an accumulation of dross or causing plunger to stick.

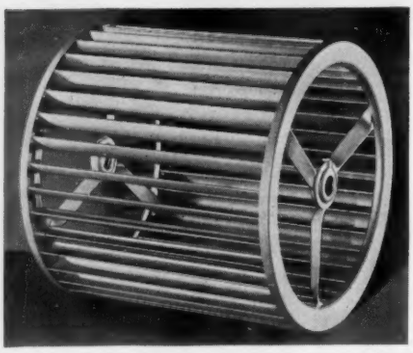
Gas-Electric Welder

■ Harnischfeger Corp., 4400 West National avenue, Milwaukee, and

Young Sales Co., Inc., Milwaukee, introduce a portable double-duty gas and electric welding unit. A P&H-Hansen 150-ampere generator is coupled to a Wisconsin air-cooled motor mounted on standard P&H trailer. Complete gas welding and cutting equipment is used with this unit. A 6-P sight feed acetylene generator is used to furnish acetylene while a special bracket is so arranged to carry either a large or small tank of oxygen.

One-Piece Blower

■ The Metal Stamping & Mfg. Co., 16816 Waterloo road, Cleveland, has recently designed a blower with blades fabricated in one complete strip and assembled as integral unit. Rim, spokes and hub are made



of one integral stamping to insure perfect alignment. Rims are channel-shaped for strength, with large radius for smooth flow of air. Spokes are formed at correct angle to offer minimum resistance to inflow of air. Blowers are adapted for use on furnaces, air conditioning units, stokers and oil burners.

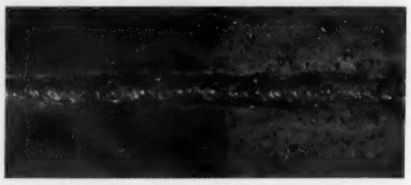
Aluminum Stage

■ Aluminum Ladder Co., Tarentum, Pa., has designed aluminum stage made in lengths from 8 to 25 feet and widths from 12 to 24 inches. Units are made in various weights for different capacities. A stage 25 x 2 feet weighs 118 pounds. All

parts are completely bolted and riveted together including wood covering.

Reduces Weld Spatter

■ Universal Power Corp., 4300 Euclid avenue, Cleveland, offers Spatter-Nox, protective coating manufactured by The Mahoning Paint & Oil Co., Youngstown, O. Brushed or sprayed over area adjacent to weld before welding, it reduces spatter from 50 to 75 per cent, does not interfere with penetration, tensile strength or ductility and increases welding speed 30 to 50 per cent by permitting a more stable arc. If coated electrodes are used, this ma-



terial reduces slag cleaning time 50 per cent. It can be used with any amount of amperage or voltage. It provides an excellent foundation for painting and prevents after-rusting adjacent to weld. Illustration shows treated and untreated portions.

Adjustable Floodlight

■ A means to provide a complete range of radial adjustment and to lock a floodlight so that it will always position itself exactly when it is raised after lowering has been developed by Thompson Electric Co., 1101 Power avenue, Cleveland. A unit package has been assembled which contains the hangar, U-bolts

for mounting to bracket, a bracket end and slip-fit elbow to enclose electrical conductors, fully enclosed corner pulley with flare end, 25 feet of galvanized chain and galvanized lock box and a spring to keep chain taut and prevent slap.

Utility Drills

■ Van Dorn Electric Tool Co., Towson, Md., has redesigned its ½-inch utility drill, which is 3⅛ inches shorter and 3 pounds lighter in weight than previous model. Other units redesigned for less weight, more compactness and greater durability are ⅜-inch heavy-duty, ⅜-inch utility, 5/16-inch heavy duty and ¼-inch heavy duty drills.

Demand Recovering From Holiday Lull

Business Rebounds To Late-June Volume; Output To Rise

MARKET IN TABLOID ★

Demand
Interrupted briefly by seasonal shutdowns.

Prices
Making further progress toward stability.

Production
Off 12 points last week to 42 per cent.

■ STEEL markets are recovering rapidly from the interruption of recent holiday and vacation shutdowns. Ingot production last week dropped 12 points to 42 per cent, but most of the loss will be retrieved this week.

Finished steel demand has rebounded to approximately the late-June rate, and consumption shortly will be bolstered by the resumption of operations by plants closed for vacations and inventory-taking. However, such gains will be offset by declining requirements of the automotive industry which is slowing down in anticipation of model changes the next four to six weeks.

A disturbing factor in the automotive outlook is the strike of General Motors tool and die workers. Timed to interfere with new model preparations, this suspension might seriously delay introduction of 1940 cars, in addition to retarding steel deliveries late this quarter when assemblies originally were expected to be increasing rapidly.

Five motor plants already have completed production of current models. This and the holiday shutdown reduced assemblies last week to 42,784 units, a drop of nearly 28,000. Output a year ago was 25,375 units.

June Pig Iron Production Nearly Doubles 1938 Rate

Pig iron production in June was 27.5 per cent ahead of the daily rate in May, when the coal strike restricted blast furnace operations. Daily output last month was 70,647 tons, against 55,404 in May and 35,358 a year ago. Active furnaces June 30 numbered 117, a gain of 11 for the month. Total production the first six months was nearly 58 per cent larger than a year ago, 12,521,131 tons against 7,931,098.

Heavier steel demand is in prospect this month from farm equipment manufacturers, following shutdowns the past two weeks by a number of plants. Business in merchant wire products employed widely in rural areas held up unusually well during June but is due for a seasonal letdown this month.

Miscellaneous steel users are contributing a large share of current demand and are counted on to be a strong supporting influence on steelmaking during July and August. Indicative of sustained steel consumption generally is the fact demand from warehouses experienced less than its usual letdown in late June and early July.

Building and engineering construction continue the leading steel outlet. Small private jobs are taking a fairly large portion of the total tonnage, but federally-financed projects still predominate. New business in fabricated structural shapes has tapered from its recent peak, but heavy shipments against old orders are indicated through August.

Car Orders In First Half Show Only Small Increase

Railroad equipment buying remains disappointing. Freight car awards of 1324 units in June brought the first-half total to 9532, less than 20 per cent larger than the 8021 units placed a year ago. This compares with 45,985 and 28,109 in the corresponding periods of 1937 and 1936, respectively. Despite moderate improvement in railroad earnings and optimistic forecasts regarding freight traffic the next six months, few freight cars are actively pending.

Shipbuilding is taking up some of the slack in railroad demand for heavy steel products, with fairly large tonnages on order and in prospect. United States maritime commission takes bids this week on additional cargo vessels and probably will order ten or more. Two ships placed by Seatrain Lines Inc., New York, require 10,000 tons, mostly plates.

Steel producers are making further progress toward price stability. Withdrawal July 1 of prices below official levels on several more products should raise the average return on new business this month to the best figure so far this year.

All districts shared in last week's steelmaking decline. Pittsburgh was down 11 points to 36 per cent, Chicago 6½ points to 44½, Youngstown 15 points to 38, eastern Pennsylvania 6 points to 32, Wheeling 17 points, to 62, Cleveland 23½ points to 27½, Buffalo 2½ points to 32½, Cincinnati 37 points to 28, St. Louis 11 points to 31, Detroit 1 point to 56 and Birmingham 6 points to 65.

Scrap prices vary from steady to strong, but the composite is unchanged at $14.54. The finished steel composite is down 10 cents to $55.60.

COMPOSITE MARKET AVERAGES

	July 8	July 1	June 24	One Month Ago June, 1939	Three Months Ago April, 1939	One Year Ago July, 1938	Five Years Ago July, 1934
Iron and Steel	$35.81	$35.72	$35.72	$35.69	$36.34	$36.32	$32.32
Finished Steel	55.60	55.70	55.70	55.70	56.50	57.20	54.05
Steelworks Scrap..	14.54	14.54	14.62	14.49	14.98	13.06	10.30

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	July 8, 1939	June, 1939	April, 1939	July, 1938
Steel bars, Pittsburgh	2.15c	2.15c	2.25c	2.25c
Steel bars, Chicago	2.15	2.15	2.25	2.25
Steel bars, Philadelphia	2.47	2.47	2.57	2.57
Iron bars, Terre Haute, Ind.	2.05	2.05	2.15	2.15
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.215	2.215	2.215	2.215
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.10	2.10	2.10	2.10
Plates, Philadelphia	2.15	2.15	2.15	2.15
Plates, Chicago	2.10	2.10	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.00	2.00	2.15	2.15
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.20	3.20
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50
Sheets, hot-rolled, Gary	2.00	2.00	2.15	2.15
Sheets, cold-rolled, Gary	3.05	3.05	3.20	3.20
Sheets, No. 24 galv., Gary	3.50	3.50	3.50	3.50
Bright bess., basic wire, Pitts.	2.60	2.60	2.60	2.60
Tin plate, per base box, Pitts.	$5.00	$5.00	$5.00	$5.35
Wire nails, Pittsburgh	2.45	2.45	2.45	2.45

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00
Wire rods, No. 5 to $\frac{9}{32}$-inch, Pitts.	43.00	43.00	43.00	43.00

Pig Iron

	July 8, 1939	June, 1939	April, 1939	July, 1938
Bessemer, del. Pittsburgh	$22.34	$22.34	$22.34	$21.34
Basic, Valley	20.50	20.50	20.50	19.50
Basic, eastern, del. Philadelphia	22.34	22.34	22.34	21.34
No. 2, foundry, Pittsburgh	22.21	22.21	22.21	21.21
No. 2, foundry, Chicago	21.00	21.00	21.00	20.00
Southern No. 2, Birmingham	17.38	17.38	17.38	16.38
Southern No. 2 del. Cincinnati	20.89	20.89	20.89	19.89
No. 2X, del. Phila. (differ. av.)	23.215	23.215	23.215	22.215
Malleable, Valley	21.00	21.00	21.00	20.00
Malleable, Chicago	21.00	21.00	21.00	20.00
Lake Sup., charcoal, del. Chicago	28.34	28.34	28.34	28.34
Gray forge, del. Pittsburgh	21.17	21.17	21.17	20.17
Ferromanganese,del. Pittsburgh	85.33	85.33	85.33	97.77

Scrap

Heavy melting steel, Pittsburgh	$15.25	$15.00	$15.50	$13.75
Heavy melt. steel, No. 2, E. Pa	13.25	13.125	13.65	12.20
Heavy melting steel, Chicago	13.25	13.40	13.35	12.05
Rails for rolling, Chicago	17.75	17.65	17.25	17.05
Railroad steel specialties, Chicago	15.50	15.30	15.35	14.95

Coke

Connellsville, furnace, ovens	$3.75	$3.75	$3.75	$3.75
Connellsville, foundry, ovens	5.00	5.00	5.00	5.00
Chicago, by-product fdry., del.	10.50	10.50	10.50	10.80

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Except when otherwise designated, prices are base, f.o.b. cars.

Sheet Steel

Hot Rolled

Pittsburgh	2.00c
Chicago, Gary	2.00c
Cleveland	2.00c
Detroit, del.	2.00c
Buffalo	2.00c
Sparrows Point, Md.	2.00c
New York, del.	2.24c
Philadelphia, del.	2.17c
Granite City, Ill.	2.10c
Middletown, O.	2.00c
Youngstown, O.	2.00c
Birmingham	2.00c
Pacific Coast points	2.50c

Cold Rolled

Pittsburgh	3.05c
Chicago, Gary	3.05c
Buffalo	3.05c
Cleveland	3.05c
Detroit, delivered	3.15c
Philadelphia, del.	3.37c
New York, del.	3.39c
Granite City, Ill.	3.15c
Middletown, O.	3.05c
Youngstown, O.	3.05c
Pacific Coast points	3.65c

Galvanized No. 24

Pittsburgh	3.50c
Chicago, Gary	3.50c
Buffalo	3.50c
Sparrows Point, Md.	3.50c
Philadelphia, del.	3.67c
New York, delivered	3.74c
Birmingham	3.50c
Granite City, Ill.	3.60c
Middletown, O.	3.50c
Youngstown, O.	3.50c
Pacific Coast points	4.00c

Black Plate, No. 29 and Lighter

Pittsburgh	3.05c
Chicago, Gary	3.05c
Granite City, Ill.	3.15c

Long Ternes No. 24 Unassorted

Pittsburgh, Gary	3.80c
Pacific Coast	4.50c

Enameling Sheets

	No. 10	No. 20
Pittsburgh	2.75c	3.35c
Chicago, Gary	2.75c	3.35c
Granite City, Ill.	2.85c	3.45c
Youngstown, O.	2.75c	3.35c
Cleveland	2.75c	3.35c
Middletown, O.	2.75c	3.35c
Pacific Coast	3.35c	3.95c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 304
Bars	24.00	25.00
Plates	27.00	29.00
Sheets	34.00	36.00
Hot strip	21.50	23.50
Cold strip	28.00	30.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	18.50	19.00	22.50	27.50
Plates	21.50	22.00	25.50	30.50
Sheets	26.50	29.00	32.50	36.50
Hot strip	17.00	17.50	24.00	35.00
Cold stp.	22.00	22.50	32.00	52.00

Steel Plate

Pittsburgh	2.10c
New York, del.	2.19-2.29c
Philadelphia, del.	2.15c
Boston, delivered	2.42c
Buffalo, delivered	2.33c
Chicago or Gary	2.10c
Cleveland	2.10c
Birmingham	2.10c
Coatesville, base	2.10c
Sparrows Point, base	2.10c
Claymont, del.	2.10c
Youngstown	2.10c
Gulf ports	2.45c
Pacific Coast points	2.60c

Steel Floor Plates

Chicago	3.35c
Gulf ports	3.70c
Pacific Coast ports	3.95c
Pittsburgh	3.35c

Standard Shapes

Pittsburgh	2.10c
Philadelphia, del.	2.21½c
New York, del.	2.27c
Boston, delivered	2.41c
Bethlehem	2.10c
Chicago	2.10c
Cleveland, del.	2.30c
Buffalo	2.10c
Gulf ports	2.45c
Birmingham	2.10c
St. Louis, del.	2.34c
Pacific Coast points	2.70c

Tin and Terne Plate

Tin Plate, Coke (base box)

Pittsburgh, Gary, Chicago	$5.00
Granite City, Ill.	5.10

Mfg. Terne Plate (base box)

Pittsburgh, Gary, Chicago	$4.30
Granite City, Ill.	4.40

Bars

Soft Steel

(Base, 3 tons or over)

Pittsburgh	2.15c
Chicago or Gary	2.15c
Duluth	2.25c
Birmingham	2.15c
Cleveland	2.15c
Buffalo	2.15c
Detroit, delivered	2.25c
Philadelphia, del.	2.47c
Boston, delivered	2.52c
New York, del.	2.49c
Gulf ports	2.50c
Pacific Coast points	2.75c

Rail Steel

(Base, 15 tons or over)

Pittsburgh	2.00c
Chicago or Gary	2.00c
Detroit, delivered	2.10c
Cleveland	2.00c

Buffalo	2.00c
Birmingham	2.00c
Gulf ports	2.35c
Pacific Coast points	2.60c

Iron

Chicago, Terre Haute	2.05c
Philadelphia	2.37c
Pittsburgh, refined	3.50-8.00c

Reinforcing

New billet, straight lengths, quoted by distributors

Chicago, Gary, Buffalo Cleve., Birm., Young., Sparrows Pt., Pitts.	1.80-2.05c
Detroit, delivered	1.90-2.15c
Gulf ports	2.20-2.40c
Pacific coast ports	2.50c
Philadelphia, del.	1.97-2.22c

Rail steel, straight lengths, quoted by distributors

Pittsburgh, Gary, Chicago, Buffalo, Cleveland, Birm.	1.75-1.90c
Detroit, delivered	1.85-2.00c
Gulf ports	2.10-2.25c
Pacific Coast	2.35c

Wire Products

Pitts.-Cleve.-Chicago-Birm. base per 100 lb. keg in carloads

Standard wire nails	$2.40
Cement coated nails	$2.40
(Per pound)	
Polished staples	3.10c
Galv. fence staples	3.35c
Galv. barbed wire, standard 12½ gage two-point hog, 80-rod spool $2.74; two-point cattle, 80-rod spool	$2.58
Annealed fence wire	2.90c
Galv. fence wire	3.30c
Woven wire fencing (base C. L. column)	67.00
Single loop bale ties, (base C. L. column)	56.00

To Manufacturing Trade

Base, Pitts. - Cleve. - Chicago-Birmingham (except spring wire)

Bright bess., basic wire	2.60c
Galvanized wire	2.65c
Spring wire	3.20c

Worcester, Mass., $2 higher on bright basic and spring wire.

Cut Nails

Carloads, Pittsburgh $3.60

Cold-Finished Bars

	Carbon	Alloy
Pittsburgh	2.65c	3.35c
Chicago	2.65c	3.35c
Gary, Ind.	2.65c	3.35c
Detroit	2.70c	*3.45c
Cleveland	2.65c	3.35c
Buffalo	2.65c	3.35c

*Delivered.

Alloy Bars (Hot)

(*Base, 3 tons or over*)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem	2.70c
Detroit, delivered	2.80c

Alloy	Diff.	Alloy	Diff.
2000	0.35	3100	0.70
2100	0.75	3200	1.35
2300	1.55	3300	3.80
2500	2.25	3400	3.20

4100 0.15 to 0.25 Mo. 0.55
4600 0.20 to 0.30 Mo. 1.50-2.00 Ni. 1.10
5100 0.80-1.10 Cr. 0.45
5100 Cr. spring flats 0.15
6100 bars 1.20
6100 spring flats 0.85
Cr. N., Van. 1.50
Carbon Van. 0.85
9200 spring flats 0.15
9200 spring rounds, squares 0.40

Electric furnace up 50 cents.

Strip and Hoops

(*Base, hot strip, 1 ton or over; cold, 3 tons or over*)

Hot Strip, 12-inch and less

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, Birmingham	2.00c
Detroit, del.	2.10c
Philadelphia, del.	2.32c
New York, del.	2.36c
Cooperage hoop, Youngs., Pitts.; Chicago, Birm.	2.10c
Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland, Youngstown	2.80c
Chicago	2.90c
Detroit, del.	2.90c
Worcester, Mass.	3.00c

Carbon	Cleve.,	Pitts.
0.26—0.50		2.80c
0.51—0.75		4.30c
0.76—1.00		6.15c
Over 1.00		8.35c

Worcester, Mass $4 higher.

Commodity Cold-Rolled Strip

Pitts.-Cleve.-Youngstown	2.95c
Detroit, del.	3.05c
Worcester, Mass.	3.35c

Lamp stock up 10 cents.

Rails, Fastenings

(*Gross Tons*)

Standard rails, mill	$40.00
Relay rails, Pittsburgh 20—100 lbs.	32.50-35.50
Light rails, billet qual., Pitts., Chicago, B'ham.	$40.00
Do., rerolling quality	39.00

Cents per pound

Angle bars, billet, mills	2.70c
Do., axle steel	2.35c
Spikes, R. R. base	3.00c
Track bolts, base	4.15c
Car axles forged, Pitts., Chicago, Birmingham	3.15c
Tie plates, base	2.15c

Base, light rails 25 to 60 lbs., 20 lbs., up $2; 16 lbs. up $4; 12 lbs. up $8; 8 lbs. up $10. Base railroad spikes 200 kegs or more; base plates 20 tons.

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade as per Dec. 1, 1932, lists, carloads 5% up; full containers additional 10%.

Carriage and Machine

½ x 6 and smaller	68.5 off
Do. larger, to 1-in.	66 off
Do. 1⅛ and larger	64 off
Tire bolts	52.5 off

Stove Bolts

In packages with nuts attached 72.5 off; in packages with nuts separate 72.5-12½ off; bulk 84 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Step bolts	60 off
Elevator bolts	60 off
Plow bolts	68.5 off

Nuts

Semifinished hex.	U.S.S.	S.A.E.
6-inch and less	67	70
⅞-1-inch	64	65
1⅛ and larger	62	62

Hexagon Cap Screws

Upset, 1-in., smaller ..... 67.5 off

Square Head Set Screws

Upset, 1-in., smaller	75.0 off
Headless set screws	70.0 off

Piling

Pitts., Chgo., Buffalo	2.40c
Gulf ports	2.75c

Rivets, Washers

Structural, Pittsburgh, Cleveland, Chicago	3.40c
⅞-inch and smaller, 11 and 12	63½ 54
Pitts., Chi., Cleve.	65-10 off
Wrought washers, Pitts., Chi., Phila., to jobbers and large nut, bolt mfrs. l.c.l. $5.40; c.l. $5.75 off	

Welded Iron, Steel Pipe

Base discounts on steel pipe. Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Chicago delivery 2½ and 1½ less, respectively. Wrought pipe, Pittsburgh base.

Butt Weld

Steel

In.	Blk.	Galv.
⅛	63½	54
¼	66½	58
1—3	68½	60½

Iron

¼	30	13
1—1¼	34	19
1½	38	21½
2	37½	21

Lap Weld

Steel

2	61	52½
2½—3	64	55½
3½—6	66	57½
7 and 8	65	55½
9 and 10	64½	55

Iron

2	30½	15
2½—3½	31½	17½
4	33½	21
4½—8	32½	20
9—12	28½	15

Line Pipe

Steel

1 to 3, butt weld	67½	
2, lap weld	60	
2½ to 3, lap weld	63	
3½ to 6, lap weld	65	
7 and 8, lap weld	64	
10-inch lap weld	63½	
12-inch, lap weld	62½	

Iron

	Blk.	Galv.
⅜ butt weld	25	7
1 and 1¼ butt weld	29	13
1½ butt weld	33	15½
2 butt weld	32½	15
1½ lap weld	23½	7
2 lap weld	25½	9
2½ to 3½ lap weld	26½	11½
4 lap weld	28½	15
4½ to 8 lap weld	27½	14
9 to 12 lap weld	23½	9

Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cut lengths 4 to 24 feet; f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.

Lap Welded

Sizes	Gage	Steel	Charcoal Iron
1½" O. D.	13	$ 9.72	$23.71
1¾" O. D.	13	11.06	22.93
2" O. D.	13	12.38	19.35
2¼" O. D.	13	13.79	21.68
2¼" O. D.	12	15.16	.....
2½" O. D.	12	16.58	26.57
2¾" O. D.	12	17.54	29.00
3" O. D.	12	18.35	31.36
3½" O. D.	11	23.15	39.81
4" O. D.	10	28.66	49.90
5" O. D.	9	44.25	73.93
6" O. D.	7	68.14	.....

Seamless

Sizes	Gage	Hot Rolled	Cold Drawn
1" O. D.	13	$ 7.82	$ 9.01
1¼" O. D.	13	9.26	10.67
1½" O. D.	13	10.23	11.79
1¾" O. D.	13	11.64	13.42
2" O. D.	13	13.04	15.03
2¼" O. D.	13	14.54	16.76
2½" O. D.	12	16.01	18.45
2½" O. D.	12	17.54	20.21
2¾" O. D.	12	18.59	21.42
3" O. D.	12	19.50	22.48
3½" O. D.	11	24.62	28.37
4" O. D.	10	30.54	35.20
4½" O. D.	10	37.35	43.04
5" O. D.	9	46.87	54.01
6" O. D.	7	71.96	82.93

Cast Iron Pipe

Class B Pipe—Per Net Ton

6-in., & over, Birm.	$42.00-43.00
4-in., Birmingham	45.00-46.00
4-in., Chicago	53.80-54.80
6-in. & over, Chicago	50.80-51.80
6-in. & over, east fdy.	46.00
Do., 4-in.	49.00

Class A Pipe $3 over Class B
Stnd. fitgs., Birm., base $100.00

Semifinished Steel

Rerolling Billets, Slabs

(*Gross Tons*)

Pittsburgh, Chicago, Gary, Cleve., Buffalo, Young., Birm., Sparrows Point	$34.00
Duluth (billets)	36.00
Detroit, delivered	36.00

Forging Quality Billets

Pitts., Chi., Gary, Cleve., Young., Buffalo, Birm.	40.00
Duluth	42.00

Sheet Bars

Pitts., Cleveland, Young., Sparrows Point, Buffalo, Canton, Chicago	34.00
Detroit, delivered	36.00

Wire Rods

Pitts., Cleveland, Chicago, Birmingham No. 5 to ⅜-inch incl.	43.00
Do., over ⅜ to 47/64-in. incl.	48.00

Worcester up $2; Galveston up $6; Pacific Coast up $9.

Skelp

Pitts., Chi., Young., Buff., Coatesville, Sparrows Pt.	1.90c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$3.75
Connellsville, fdry.	4.75- 5.50
Connell. prem. fdry.	5.75- 6.25
New River fdry.	6.50- 6.75
Wise county fdry.	5.50- 5.75
Wise county fur.	4.50- 4.75

By-Product Foundry

Newark, N. J., del.	10.88-11.35
Chi., ov., outside del.	9.75
Chicago, del.	10.50
Terre Haute, del.	10.00
Milwaukee, ovens	10.50
New England, del.	12.50
St. Louis, del.	11.00-11.50
Birmingham, ovens	7.00
Indianapolis, del.	10.00
Cincinnati, del.	9.75
Cleveland, del.	10.30
Buffalo, del.	10.50
Detroit, del.	10.25
Philadelphia, del.	10.65

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	16.00c
Toluol, two degree	22.00c
Solvent naphtha	26.00c
Industrial xylol	26.00c

Per lb. f.o.b. Frankford and St. Louis

Phenol (200 lb. drums)	16.25c
Do. (450 lbs.)	15.25c

Eastern Plants, per lb.

Naphthalene flakes, balls, bbls. to jobbers	5.75c
Per ton, bulk, f.o.b. port	
Sulphate of ammonia	$28.00

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25 sil.; 50c diff. below 1.75 sil. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$22.00	$22.50	$21.50	$23.00
Birdsboro, Pa.	22.00	22.50	21.50	23.00
Birmingham, Ala.‡	17.38	.....	16.38	22.00
Buffalo	21.00	21.50	20.00	22.00
Chicago	21.00	21.00	20.50	21.50
Cleveland	21.00	21.00	20.50	21.50
Detroit	21.00	21.00	20.50	21.50
Duluth	21.50	21.50	.....	22.00
Erie, Pa.	21.00	21.50	20.50	22.00
Everett, Mass.	22.00	22.50	21.50	23.00
Granite City, Ill.	21.00	21.00	20.50	21.50
Hamilton, O.	21.00	21.00	20.50	.....
Neville Island, Pa.	21.00	21.00	20.50	21.50
Provo, Utah	19.00	.....	.....	.....
Sharpsville, Pa.	21.00	21.00	20.50	21.50
Sparrow's Point, Md.	22.00	.....	21.50	.....
Swedeland, Pa.	22.00	22.50	21.50	23.00
Toledo, O.	21.00	21.00	20.50	21.50
Youngstown, O.	21.00	21.00	20.50	21.50

‡Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:				
Akron, O., from Cleveland	22.39	22.39	21.89	22.89
Baltimore from Birmingham	22.78	.....	21.66	.....
Boston from Birmingham	22.12	.....	.....	.....
Boston from Everett, Mass.	22.50	23.00	22.00	23.50
Boston from Buffalo	22.50	23.00	22.00	23.50
Brooklyn, N. Y., from Bethlehem	24.50	25.00	.....	.....
Canton, O., from Cleveland	22.39	22.39	21.89	22.89
Chicago from Birminghom	†21.22	.....	.....	.....
Cincinnati from Hamilton, O.	21.24	22.11	21.61	.....
Cincinnati from Birmingham	21.06	.....	20.06	.....
Cleveland from Birmingham	21.32	.....	20.82	.....
Mansfield, O., from Toledo, O.	22.94	22.94	22.44	22.44
Milwaukee from Chicago	22.10	22.10	21.60	22.60
Muskegon, Mich., from Chicago, Toledo or Detroit	24.19	24.19	23.69	24.69
Newark, N. J., from Birmingham	23.15	.....	.....	.....
Newark, N. J., from Bethlehem	23.53	24.03	.....	.....
Philadelphia from Birmingham	22.46	.....	21.96	.....
Philadelphia from Swedeland, Pa.	22.84	23.34	22.34	.....
Pittsburgh district from Neville Island	Neville base, plus 69c, 84c, and $1.24 freight.			
Saginaw, Mich., from Detroit	23.45	23.45	22.95	22.95

	No. 2 Fdry.	Malleable	Basic	Bessemer
St. Louis, northern	21.50	21.50	21.00	.....
St. Louis from Birmingham	†21.12	.....	20.62	.....
St. Paul from Duluth	23.63	23.63	.....	24.13

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., $26.50, base; $27.74 delivered Philadelphia.

Gray Forge		Charcoal	
Valley furnace	$20.50	Lake Superior fur.	$25.00
Pitts. dist. fur.	20.50	do., del Chicago	28.34
		Lyles, Tenn.	23.50

†Silvery

Jackson county, O., base: 6-6.50 per cent $25.50; 6.51-7—$26.00; 7-7.50—$26.50; 7.51-8—$27.00; 8-8.50—$27.50; 8.51-9—$28.00; 9-9.50—$28.50; Buffalo, $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base; Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, $1 per ton add. Each unit over 3%, add $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$60.80

First Quality

Pa., Ill., Md., Mo., Ky.	47.50
Alabama, Georgia	47.50
New Jersey	52.50

Second Quality

Pa., Ill., Ky., Md., Mo.	42.75
Georgia, Alabama	34.20
New Jersey	49.00

Ohio

First quality	39.90
Intermediate	36.10
Second quality	31.35

Malleable Bung Brick

All bases	$56.05

Silica Brick

Pennsylvania	$47.50
Joliet, E. Chicago	55.10
Birmingham, Ala.	47.50

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$28.00
Wire cut	$26.00

Magnesite

Imported dead - burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	$45.00
Do. domestic	40.00
Do., f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00
Quickset magnesite grains, f.o.b. Chewelah, Wash., net, bulk	22.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$47.00
Chem. bonded chrome	47.00
Magnesite brick	67.00
Chem. bonded magnesite	57.00

Fluorspar, 85-5

Washed gravel, duty pd., tide, net ton	$21.00-21.50
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail	18.00
Do. barge	19.00
No. 2 lump	18.00-19.00

Ferroalloy Prices

Ferromanganese, 78-82%, tidewater, duty pd. $80.00
Do., del. Pittsburgh 85.33

Spiegeleisen, 19-21% dom. Palmerton, Pa., spot 28.00
Do., 26-28%, Palmerton 33.00

Ferrosilicon, 50% freight allowed, c.l. 69.50
Do., ton lot 80.50
Do., 75 per cent 126.00
Spot, $5 a ton higher.

Silicoman, 2½ carbon 88.00
2% carbon, 93.00; 1% 103.00
Contract ton price $11 higher; spot $5 over contract.

Ferrotungsten, stand., lb. con. del. cars 1.60-1.65

Ferrovanadium, 35 to 40%, lb., cont. 2.70-2.80-2.90

Ferrophosphorus, gr. ton, c.l., 17-18% Rockdale, Tenn., basis, 18%, $3 unitage, 58.50; electrolytic, per ton, c. l., 23-26% f.o.b. Monsanto, Tenn., 24% $3 unitage 75.00

Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb., contained cr., del. carlots 10.50c
Do., ton lots 11.25c
Do., less-ton lots 11.50c

67-72% carloads, 2% carbon, per lb. contained chrome 16.50c
Do., ton lots 17.25c
Do., less-ton lots 17.75c

	Carloads	Ton lots	Less ton
2% carb.	16.50c	17.25c	17.50c
1% carb.	17.50c	18.25c	18.50c
0.10% carb.	18.50c	19.25c	19.50c
0.20% carb.	19.50c	20.25c	20.50c

Spot ¼c higher

Ferromolybdenum, 55-65% molyb. cont., f.o.b. mill, lb. 0.95

Calcium molybdate, lb. molyb. cont., f.o.b. mill 0.80

Ferrotitanium, 40-45%, lb., con. ti., f.o.b. Niagara Falls, ton lots $1.23
Do., less-ton lots 1.25
20-25% carbon, 0.10 max., ton lots, lb. 1.35
Do, less-ton lots 1.40
Spot 5c higher

Ferrocolumbium, 50-60%, contract, lb. con. col., f.o.b. Niagara Falls $2.25
Do, less-ton lots 2.30
Spot is 10c higher

Technical molybdenum trioxide, 53 to 60% molybdenum, lb. molyb. cont., f.o.b. mill 0.80

Ferro-carbon-titanium, 15-18%, ti., 6-8% carb., carlots, contr., net ton $142.50
Do, spot 145.00
Do, contract, ton lots 145.00
Do, spot, ton lots 150.00

15-18% ti., 3-5% carbon, carlots, contr., net ton 157.50
Do, spot 160.00
Do, contract, ton lots 160.00
Do, spot, ton lots 165.00

Alsifer, contract carlots, f.o.b. Niagara Falls, lb. 7.50c
Do, ton lots 8.00c
Do, less-ton lots 8.50c
Spot ½c lb. higher

Chromium Briquets, contract, any quantity, freight allowed, lb. 7.25c
Do, spot carlots, bulk 7.50c
Do, ton lots 8.00c
Do., less-ton lots 8.25c

Tungsten Metal Powder, according to grade, spot shipment, 200-lb. drum lots, lb. $2.00
Do, smaller lots 2.10

Vanadium Pentoxide, contract, lb. contained $1.10
Do, spot 1.15

Chromium Metal, 98% cr., 0.50 carbon max., contract, lb. con. chrome 80.00c
Do, spot 85.00c
88% chrome, contract 79.00c
Do, spot 84.00c

Silicon Metal, 1% iron, contract, carlots, 2 x ⅛-in., lb. 14.00c
Do, 2% 12.50c
Spot ¼c higher

Silicon Briquets, contract carloads freight allowed, ton $69.50
Carload, spot 74.50
Less-ton lots, lb. 3.75c

Manganese Briquets, contract carloads, bulk freight allowed, lb. 4.50c
Ton lots 5.06c
Less-ton lots 5.25c
Spot ¼c higher

Zirconium Alloy, 12-15%, contract, carloads, gross ton $97.50
Do, spot 102.50
34-40%, contract, carloads, lb., alloy 14.00c
Do, ton lots 15.00c
Do, less-ton lots 16.00c
Spot ¼c higher

Molybdenum Powder, 99%, f.o.b. York, Pa. 200-lb. kegs, lb. $2.60
Do, 100-200 lb. lots 2.75
Do, under 100-lb. lots 3.00

Molybdenum Oxide Briquets, 48-52% molybdenum, per pound contained, f.o.b. producers' plant 80.00c

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials

	Soft Bars	Bands	Hoops	Plates ¼-in. & Over	Structural Shapes	Floor Plates	Sheets: Hot Rolled	Sheets: Cold Rolled	Sheets: Galv. No. 24	Cold Rolled Strip	Cold Drawn Bars: Carbon	Cold Drawn Bars: SAE 2300	Cold Drawn Bars: SAE 3100
Boston	3.88	4.06	5.06	3.85	3.85	5.66	3.71	4.78	4.61	3.46	4.13	8.63	7.23
New York (Met.)	3.84	3.96	3.96	3.76	3.75	5.56	3.40	4.60	4.50	3.51	4.09	8.59	7.19
Philadelphia	3.60	3.60	4.10	3.40	3.40	5.00	3.40	4.55	4.28	3.51	4.06	8.56	7.16
Baltimore	3.70	3.85	3.80	3.55	3.55	5.00	3.55	4.90	5.05	....	4.05	....	....
Norfolk, Va.	3.90	4.00	....	3.75	3.75	5.20	3.75	....	5.40	....	4.15	....	....
Buffalo	3.35	3.82	3.82	3.62	3.40	5.25	3.35	4.40	4.40	3.42	3.75	8.15	6.75
Pittsburgh	3.35	3.60	3.60	3.40	3.40	5.00	3.35	....	4.50	3.35	3.65	8.35	6.95
Cleveland	3.25	3.50	3.50	3.40	3.58	5.18	3.35	4.55	4.62	3.20	3.75	8.15	6.75
Detroit	3.33	3.43	3.68	3.60	3.65	5.27	3.43	4.50	4.59	3.40	3.80	8.45	7.05
Cincinnati	3.60	3.67	3.67	3.65	3.68	5.28	3.42	....	4.57	3.45	4.00	8.50	7.10
Chicago	3.50	3.60	3.60	3.55	3.55	5.15	3.35	4.30	4.25	3.50	3.75	8.15	6.75
Twin Cities	3.75	3.85	3.85	3.80	3.80	5.40	3.60	4.95	4.50	3.83	4.34	8.84	7.44
Milwaukee	3.63	3.73	3.73	3.68	3.68	5.28	3.48	4.43	4.38	....	3.88	8.38	6.98
St. Louis	3.62	3.72	3.72	3.47	3.47	5.07	3.38	4.32	4.52	3.61	4.02	8.52	7.12
Kansas City	4.05	4.15	4.15	4.00	4.00	5.60	3.90	....	5.00	....	4.30	....	....
Memphis	3.90	4.00	4.00	3.95	3.95	5.71	3.75	....	5.00	....	4.31	....	....
Chattanooga	3.80	3.90	3.90	3.85	3.85	5.80	3.65	....	4.40	....	4.39	....	....
Tulsa, Okla.	4.54	4.64	4.64	4.41	4.41	6.01	4.32	....	5.39	....	4.79	....	....
Birmingham	3.50	3.60	3.60	3.55	3.55	5.88	3.35	....	4.85	....	4.43	....	....
New Orleans	3.85	4.65	4.65	3.80	3.80	5.75	4.10	....	4.60	5.00	5.10	....	....
Houston, Tex.	3.50	5.85	6.25	4.05	4.05	5.65	3.95	....	5.25	....	....	....	....
Seattle	3.90	4.10	5.45	3.85	3.95	5.75	3.80	....	5.00	....	5.60	....	....
Portland, Oreg.	4.00	4.40	6.10	4.00	4.00	5.50	3.95	6.50	4.75	....	5.60	....	....
Los Angeles	4.00	4.50	6.35	4.00	4.00	6.20	4.20	6.30	5.00	4.45	6.00	10.40	9.55
San Francisco	3.50	3.90	6.00	3.45	3.45	5.05	3.45	6.40	5.15	7.30	6.55	10.65	9.80

	SAE Hot-rolled Bars (Unannealed): 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series
Boston	4.18	7.50	6.05	5.80	7.90
New York (Met.)	4.04	7.35	5.90	5.65	....
Philadelphia	3.85	7.31	5.86	5.61	7.71
Baltimore	3.85	....	....	....	....
Norfolk, Va.	....	....	....	....	....
Buffalo	3.55	7.10	5.65	5.40	7.50
Pittsburgh	3.40	7.35	5.95	5.50	7.60
Cleveland	3.30	7.30	5.85	5.85	7.70
Detroit	3.38	7.42	5.97	5.72	7.19
Cincinnati	3.65	7.44	5.99	5.74	7.84
Chicago	3.70	7.10	5.65	5.40	7.50
Twin Cities	3.95	7.45	6.00	6.09	8.19
Milwaukee	3.78	7.33	5.88	5.63	7.73
St. Louis	3.82	7.47	6.02	5.77	7.87
Seattle	5.65	....	7.80	7.65	8.45
Portland, Oreg.	6.10	9.00	8.00	7.85	8.70
Los Angeles	4.65	9.40	8.55	8.40	9.05
San Francisco	4.50	9.65	8.80	8.65	9.30

BASE QUANTITIES

Soft Bars, Bands, Hoops, Plates, Shapes, Floor Plates and SAE 1035-1050 Bars: Base, 400-1999 pounds, except 400-14,999 pounds in Twin Cities; 400-3999 pounds in Birmingham; 0-299 pounds (hoops only) in San Francisco; 300-1999 in Los Angeles.

Hot Rolled Sheets: Base, 400-1999 pounds, except 0-1999 pounds in New York; 400-14 999 pounds in Twin Cities; 400-3999 pounds in Birmingham; 300-1999 in Los Angeles.

Cold Rolled Sheets: Base, 400-1499 pounds in Chicago, Cincinnati, Cleveland, New York and St. Louis; 400-1499 pounds in Detroit; 450-3749 pounds in Boston; 500-1499 pounds in Buffalo; 1000-1999 pounds in Philadelphia; 300-4999 pounds in San Francisco; any quantity in Twin Cities.

Galvanized Sheets: Base, 0-1499 pounds in New York and Tulsa; 150-1499 pounds in Cleveland; 1-9 bundles in Baltimore and Norfolk; 1-6 bundles in Los Angeles; 300-4999 pounds in San Francisco; 450-3749 pounds in Boston; 500-1499 pounds in Birmingham, Chicago, Cincinnati, Detroit and St. Louis; 1500 pounds and over in Chattanooga and Philadelphia.

Cold Rolled Strip: No base quantity; extras apply on lots of all size.

Cold Finished Bars: Base, 1000 pounds and over, except 0-299 pounds in San Francisco.

SAE Hot Rolled Alloy Bars: Base, 1000 pounds and over, except 0-4999 pounds in San Francisco.

CURRENT IRON AND STEEL PRICES OF EUROPE

Dollars at Rates of Exchange, July 6

Export Prices f. o. b. Port of Dispatch—

By Cable or Radio

	British gross tons U. K. ports £ s d	Continental Channel or North Sea ports, gross tons: Quoted in dollars at current value	Continental Channel or North Sea ports, gross tons: **Quoted in gold pounds sterling £ s d
Foundry, 2.50-3.00 Si.	$23.40 5 0 0	$17.89	2 2 0
Basic bessemer	....	19.81	2 6 6
Hematite, Phos. .03-.05	23.57 5 5 0*	.....	.....
Billets	$34.52 7 7 6	$38.34	4 10 0
Wire rods, No. 5 gage	53.24 11 7 6	43.67	5 2 6
Standard rails	$44 46 9 10 0	$48.99	5 15 0
Merchant bars	2.30c 11 0 0	1.95c	5 2 6
Structural shapes	2.09c 10 0 0	1.76c to 1.85c	4 12 6 to 4 17 6
Plates, †¼ in. or 5 mm.	2.29c 10 18 9	2.14c to 2.33c	5 12 6 to 6 2 6
Sheets, black, 24 gage or 0.5 mm.	2.72c 13 0 0	2.95c	7 15 0°
Sheets, gal., 24 ga., corr.	3.29c 15 15 0	3.52c	9 5 0
Bands and strips	2.77c 13 5 0	1.95c to 2.00c	5 2 6 to 5 5 0
Plain wire, base	4.08c 19 10 0	2.33c to 2.76c	6 2 6 to 7 5 0
Galvanized wire, base	4.86c 23 5 0	2.99c to 3.09c	7 17 6 to 8 2 6
Wire nails, base	....	2.66c to 2.85c	7 0 0 to 7 10 0
Tin plate, box 108 lbs.	$ 4.74 1 0 3	....	.....

British ferromanganese $80.00 delivered Atlantic seaboard duty-paid.

Domestic Prices at Works or Furnace—

Last Reported

	£ s d		French Francs		Belgian Francs		Reich Mark
Fdy. pig iron, Si. 2.5	$23.17	4 19 0(a)	$18.00	679.30	$16.15	475	$25.28 63
Basic bess. pig iron	21.65	4 12 6(a)	.....	.....	.....	...	27.89 (b) 69.50
Furnace coke	5.38	1 4 2	5.96	225	6.87	202	7.62 19
Billets	34.52	7 7 6	26.79	1,011	29.24	860	38.73 96.50
Standard rails	1.99c	9 10 0	1.56c	1,300	2.06c	1,375	2.38c 132
Merchant bars	2.42c	11 12 0††	1.54c	1,282	1.65c	1,100	1.98c 110
Structural shapes	2.17c	10 8 0††	1.50c	1,247	1.65c	1,100	1.93c 107
Plates, †¼-in. or 5 mm.	2.29c	10 19 3††	1.95c	1,623	2.06c	1,375	2.29c 127
Sheets, black	3.08c	14 15 0§	2.31c	1,925‡	2.36c	1,575‡	2.59c 144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.	3.61c	17 5 0	3.30c	2,750	4.13c	2,750	6.66c 370
Plain wire	4.08c	19 10 0	2.26c	1,880	2.48c	1,650	3.11c 173
Bands and strips	2.58c	12 7 0††	1.70c	1,420	1.95c	1,300	2.29c 127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continent usually for basic-bessemer steel. (a) del. Middlesbrough. 5s rebate to approved customers. (b) hematite. °Close annealed. ††Rebate of 15s on certain conditions.

**Gold pound sterling carries a premium of 75 per cent over paper sterling.

IRON AND STEEL SCRAP PRICES

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated; †indicates brokers prices

HEAVY MELTING STEEL

Birmingham, No. 1	†12.00
Bos. dock No. 1 exp.	13.75-14.00
New Eng. del. No. 1	14.00
Buffalo, No. 1, R. R.	13.50-14.00
Buffalo, No. 1	13.00-13.50
Buffalo, No. 2	11.00-11.50
Chicago, No. 1	13.25-13.50
Chicago, auto, no alloy	11.75-12.25
Chicago, No. 2 auto	10.50-11.00
Cincinnati, dealers	11.00-11.50
Cleveland, No. 1	13.75-14.25
Cleveland, No. 2	12.50-13.00
Detroit, No. 1	10.00-10.50
Detroit, No. 2	9.50-10.00
Eastern Pa., No. 1	15.50
Eastern Pa., No. 2	13.00-13.50
Federal, Ill.	10.50-11.00
Granite City, R. R.	11.25-11.75
Granite City, No. 2	10.50-11.00
Los Angeles, No. 1	12.50
Los Angeles, No. 2	11.00-11.50
L. A., No. 1 f.a.s.	14.50
L. A., No. 2 f.a.s.	13.25
N. Y. dock No. 1 exp.	12.00-12.50
Pitts., No. 1 (R. R.)	16.00-16.50
Pittsburgh, No. 1	15.00-15.50
Pittsburgh, No. 2	13.50-14.00
St. Louis, R. R.	11.50-12.00
St. Louis, No. 2	10.50-11.00
San Francisco, No. 1	13.00-13.50
Seattle, No. 1	11.00-12.00
Toronto, dirs. No. 1	9.25- 9.75
Valleys, No. 1	14.50-15.00

COMPRESSED SHEETS

Buffalo	11.00-11.50
Chicago, factory	12.25-12.75
Chicago, dealers	11.00-11.50
Cincinnati dealers	10.50-11.00
Cleveland	13.75-14.25
Detroit	11.50-12.00
E. Pa., new mat.	15.50
E. Pa., old mat.	11.50-12.00
Los Angeles	14.00-14.50
Pittsburgh	15.00-15.50
St. Louis	9.50-10.00
Valleys	14.00-14.50

BUNDLED SHEETS

Buffalo, No. 1	11.00-11.50
Buffalo, No. 2	10.00-10.50
Cleveland	9.50-10.00
Los Angeles	14.00
Pittsburgh	13.75-14.25
St. Louis	7.00- 7.50
Toronto, dealers	8.00- 8.50

SHEET CLIPPINGS, LOOSE

Chicago	8.00- 8.50
Cincinnati, dealers	6.50- 7.00
Detroit	8.00- 8.50
†Los Angeles	3.75- 4.00
St. Louis	6.00- 6.50
Toronto, dealers	4.25- 4.75

BUSHELING

Buffalo, No. 1	11.00-11.50
Chicago, No. 1	11.75-12.25
Cincin., No. 1, deal.	7.00- 7.50
Cincinnati, No. 2	2.25- 2.75
Cleveland, No. 2	7.50- 8.00
Detroit, No. 1, new	10.00-10.50
Valleys, new, No. 1	13.50-14.00
Toronto, dealers	3.75- 4.25

MACHINE TURNINGS (Long)

Birmingham	†4.50- 5.00
Buffalo	6.00- 6.50
Chicago	7.00- 7.50
Cincinnati, dealers	4.50- 5.00
Cleveland, no alloy	7.25- 7.75
Detroit	5.25- 5.75
Eastern Pa.	8.50- 9.00
Los Angeles	4.50- 5.00
New York	†3.50- 4.00
Pittsburgh	9.00- 9.50
St. Louis	4.50- 5.00
Toronto, dealers	4.25- 4.75
Valleys	9.00- 9.50

SHOVELING TURNINGS

Buffalo	7.25- 7.75
Cleveland	7.50- 8.00
Chicago	7.00- 7.50
Chicago, spcl. anal.	8.00- 8.50
Detroit	6.25- 6.75
Pitts., alloy-free	10.25-10.75

BORINGS AND TURNINGS

For Blast Furnace Use

Boston district	3.35
Buffalo	6.75- 7.25
Cincinnati, dealers	3.25- 3.75
Cleveland	7.50- 8.00
Eastern Pa.	6.50- 7.00
Detroit	5.25- 5.75
New York	†2.50- 3.00
Pittsburgh	8.50- 9.00
Toronto, dealers	3.50- 4.00

AXLE TURNINGS

Boston district	†7.50
Buffalo	9.50-10.00
Chicago, elec. fur.	13.50-14.00
East. Pa., elec. fur.	13.00-13.50
St. Louis	9.00- 9.50
Toronto	4.00- 4.25

CAST IRON BORINGS

Birmingham	†6.00- 6.50
Boston dist. chem.	†4.50
Buffalo	6.75- 7.25
Chicago	6.50- 7.00
Cincinnati, dealers	3.25- 3.75
Cleveland	7.50- 8.00
Detroit	5.25- 5.75
E. Pa., chemical	10.00-11.00
New York	†3.50- 4.00
St. Louis	2.50- 3.00
Toronto, dealers	3.75- 4.25

RAILROAD SPECIALTIES

Chicago	15.25-15.75

ANGLE BARS—STEEL

Chicago	15.25-15.75
St. Louis	13.00-13.50

SPRINGS

Buffalo	15.50-16.00
Chicago, coil	16.50-17.00
Chicago, leaf	15.00-15.50
Eastern Pa.	18.00
Pittsburgh	18.00-18.50
St. Louis	14.00-14.50

STEEL RAILS, SHORT

Birmingham	†12.00-12.50
Buffalo	16.50-17.00
Chicago (3 ft.)	16.00-16.50
Chicago (2 ft.)	16.50-17.00
Cincinnati, dealers	16.75-17.25
Detroit	16.50-17.00
Los Angeles	15.00-15.50
Pitts., 3 ft. and less	18.50-19.00
St. Louis, 2 ft. & less	16.25-16.75

STEEL RAILS, SCRAP

Boston district	†13.50-14.00
Buffalo	15.50-16.00
Chicago	13.50-14.00
Cleveland	16.50-17.00
Pittsburgh	16.00-16.50
St. Louis	13.00-13.50
Seattle	16.00

FROGS, SWITCHES

Chicago	13.50-14.00
St. Louis, cut	13.00-13.50

ARCH BARS, TRANSOMS

St. Louis	13.50-14.00

PIPE AND FLUES

Chicago, net	8.50- 9.00
Cincinnati, dealers	6.50- 7.00

RAILROAD GRATE BARS

Buffalo	9.00- 9.50
Chicago, net	7.50- 8.00
Cincinnati, dealers	6.25- 6.75
Eastern Pa.	12.50-13.00
New York	†8.50- 9.00
St. Louis	8.00- 8.50

RAILROAD WROUGHT

Birmingham	†11.00-11.50
Boston district	†9.50-10.00
Eastern Pa., No. 1	16.00-16.50
St. Louis, No. 1	9.75-10.25
St. Louis, No. 2	11.50-12.00

FORGE FLASHINGS

Boston district	†7.50
Buffalo	11.00-11.50
Cleveland	11.00-11.50
Detroit	9.50-10.00
Los Angeles	9.00
Pittsburgh	13.75-14.25

FORGE SCRAP

Boston district	†6.50
Chicago, heavy	15.50-16.00

LOW PHOSPHORUS

Cleveland, crops	17.50-18.00
Eastern Pa., crops	17.00-17.50
Pitts., billet, bloom, slab crops	19.00-19.50

LOW PHOS. PUNCHINGS

Buffalo	15.50-16.00
Chicago	15.50-16.00
Eastern Pa., crops	17.50-18.00
Pittsburgh	17.50-18.00
Seattle	15.00

RAILS FOR ROLLING

5 feet and over

Birmingham	†14.00-15.00
Boston	15.00-15.50
Chicago	17.50-18.00
New York	†14.00-14.50
Eastern Pa.	17.00-17.50
St. Louis	16.00-16.50

STEEL CAR AXLES

Birmingham	†15.00-16.00
Boston district	†14.50
Chicago, net	17.50-18.00
Eastern Pa.	20.50-21.00
St. Louis	16.00-16.50

LOCOMOTIVE TIRES

Chicago (cut)	15.50-16.00
St. Louis, No. 1	12.25-12.75

SHAFTING

Boston district	†15.75-16.00
New York	†15.50-16.00
Eastern Pa.	20.50-21.00
St. Louis, 1¼-3¾"	15.50-16.00

CAR WHEELS

Birmingham	†13.50-14.00
Boston dist., iron	†10.00
Buffalo, steel	16.00-16.50
Chicago, iron	13.50-14.00
Chicago, rolled steel	14.50-15.00
Cincin., iron, deal.	12.50-13.00
Eastern Pa., iron	15.50-16.00
Eastern Pa., steel	18.00
Pittsburgh, iron	14.50-15.00
Pittsburgh, steel	18.00-18.50
St. Louis, iron	14.00-14.50
St. Louis, iron	14.00-14.50

NO. 1 CAST SCRAP

Birmingham	†13.00-13.50
Boston, No. 1 mach.	†11.00-11.50
N. Eng. del. No. 2	12.00-12.50
N. Eng. del. textile	12.50-13.00
Buffalo, cupola	13.00-13.50
Buffalo, mach.	14.00-14.50
Chicago, agri. net	9.50-10.00
Chicago, auto net	12.50-13.00
Chicago, railroad net	11.00-11.50
Chicago, mach. net	12.00-12.50
Cincin., mach. deal.	12.00-12.50
Cleveland, mach.	17.00-17.50
Detroit, cupola, net	12.50-13.00
Eastern Pa., cupola	16.00-16.50
E. Pa., mixed yard	13.50-14.00
Los Angeles, net	13.50-14.00
Pittsburgh, cupola	15.00-15.50
San Francisco, del.	13.50-14.00
Seattle	12.00-14.50
St. Louis, cupola	12.00-12.50
St. Louis, agri. mach.	14.00-14.50
St. L., No. 1 mach.	14.50-15.00
Toronto, No. 1, mach., net	12.00-12.50

HEAVY CAST

Boston dist. break.	†9.50
New England, del.	12.50-13.00
Buffalo, break.	11.00-11.50
Cleveland, break, net	13.00-13.50
Detroit, auto net	12.50-13.00
Detroit, break	9.50-10.00
Eastern Pa.	14.75
Los Ang., auto, net	13.50
New York, break	†10.50-11.00
Pittsburgh, break	12.50-13.00

STOVE PLATE

Birmingham	†7.50- 8.00
Boston district	†8.00- 8.25
Buffalo	11.50-12.00
Chicago, net	7.75-8.25
Cincinnati, dealers	6.25- 6.75
Detroit, net	7.00- 7.50
Eastern Pa.	12.50-13.00
New York, fdy.	†10.00-10.50
St. Louis	7.50- 8.00
Toronto dealers, net	6.50- 7.00

MALLEABLE

Birmingham, R. R.	†10.50-11.00
New England, del.	11.50-12.50
Buffalo	13.50-14.00
Chicago, R. R.	15.00-15.50
Cincin., agri., deal.	10.75-11.25
Cleveland, rail	15.50-16.00
Eastern Pa., R. R.	15.00-16.50
Los Angeles	17.50-18.00
Pittsburgh, rail	15.00-15.50
St. Louis, R. R.	12.25-12.75

Iron Ore

Lake Superior Ore

Gross ton, 51½%

Lower Lake Ports

Old range bessemer	$5.25
Mesabi nonbessemer	4.95
High phosphorus	4.85
Mesabi bessemer	5.10
Old range nonbessemer	5.10

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56.63% con.	9.00-9.25
Cop.-free low phos. 58-60%	nominal

Foreign Ore

Cents per unit, c.i.f. Atlantic

Foreign manganiferous ore, 45.55% iron, 6-10% man. nom.	12.00
No. Afr. low phos.	12.00
Swedish low phos.	12.00
Spanish No. Africa basic, 50 to 60% nom.	10.00-10.50
Tungsten, short ton unit, duty pd. nom.	$17.50-18.00
N. F., fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	$23.00-24.00
Molybdenum ores sulphide, per lb. molybdenum contained, f.o.b. mill	0.75

Manganese Ore

Prices not including duty, cents per unit cargo lots.

Caucasian, 50-52% nom.	29.00
So. African, 50-52% nom.	29.00
Indian, 49-50%	27.00-28.00

Sheets, Strip

Sheet and Strip Prices, Pages 82, 83

Pittsburgh—Sheet and strip orders were cut by the holiday and inventory period, although production last week on a daily basis was steady. Sheet output averages 55 per cent, strip 30 to 35 and galvanized sheets 52.

Cleveland—Sheets are moving steadily against old orders, although little support is provided by automotive tonnage. Since the latter will continue restricted until new model operations are expanding later this quarter, mills anticipate little difficulty filling requirements of other users during July and August. Prices are steady on what little new business is appearing.

Chicago—New orders are small, but some encouragement is seen in that miscellaneous consumers are doing most buying. Releases on the bargain material booked during the price holiday are coming in stronger now but will not assume volume proportions until some time in August. Prices are described as unusually firm, but without the test of large tonnage purchasing. Galvanized sheet prices are somewhat improved also.

New York—Low carbon cold strip prices are being stabilized, little new business now being taken below quoted base prices. Specifications against low-price tonnage booked several weeks ago are steady and mills hope to clear a good part of this volume this month. New buying at firmer prices has improved in spots, with specifications from producers of automobile parts slightly heavier.

Philadelphia—Automotive specifications will expand materially the second half of July when the local body maker gets under way. The July schedule is about 50 per cent of June's. The same interest has an extensive backlog of stainless steel railroad cars, including 14 each for the Florida East Coast and Seaboard and four for the Santa Fe. Additional cars are actively pending.

Buffalo—While no marked gain has appeared in sheet and strip production, a better feeling appears in the trade. Sellers expect automotive suppliers to be more active within a few weeks, and there are indications the summer may be a better period than was anticipated a short time ago.

Cincinnati—New sheet business is lagging, but specifications are fairly well sustained in most directions. Galvanized sheet tonnage is disappointing, some buying hesitancy being ascribed to price weakness last quarter.

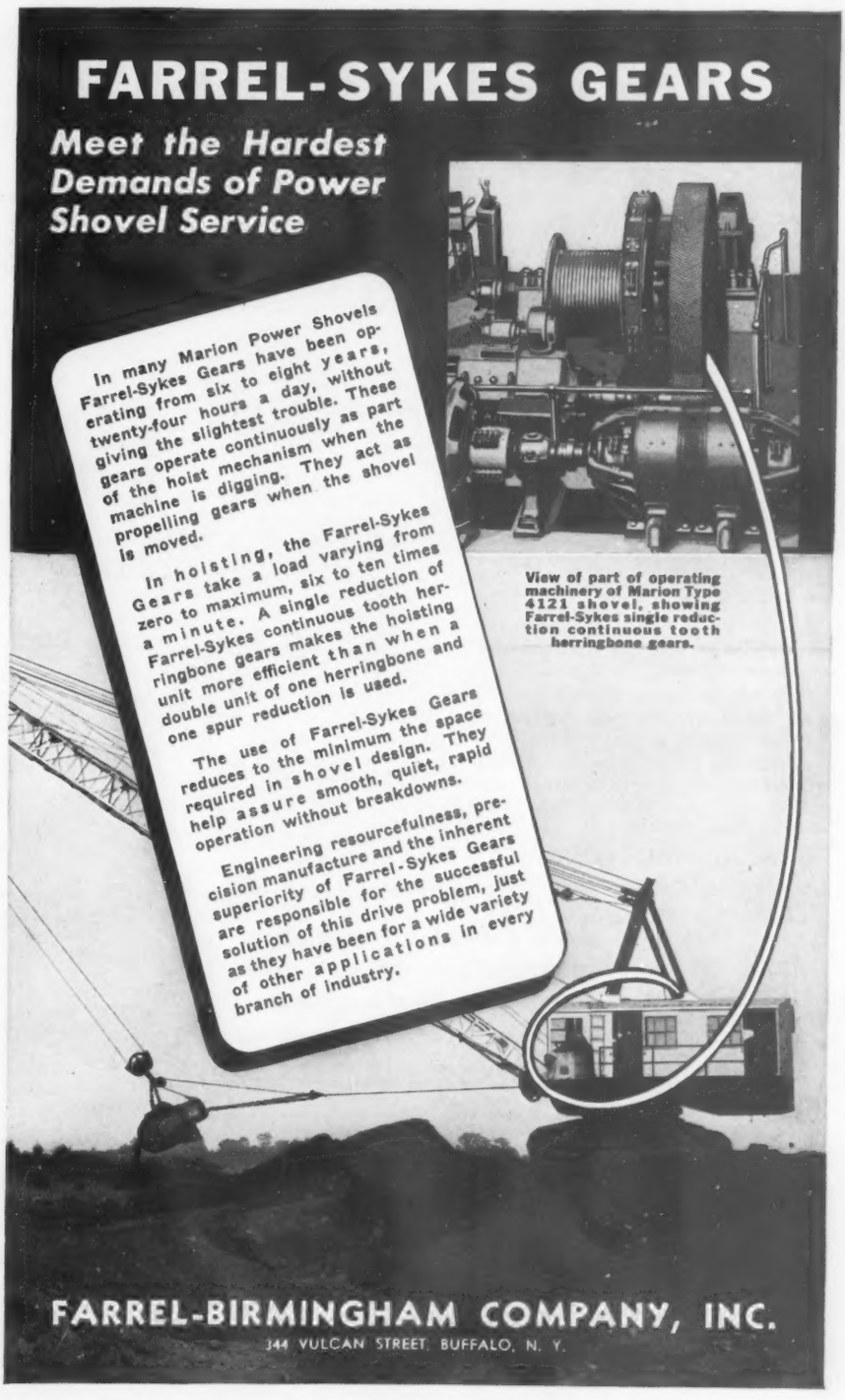
Birmingham, Ala.—Miscellaneous volume continues sufficient to maintain production near capacity in sheets. Demand is rather equally divided between manufacturers' and roofing.

Plates

Plate Prices, Page 82

Chicago—Demand is sustained, requirements of tank, pipe line, and construction interests holding at a fair level. Bridge work has been prominent recently, but railroad needs are light and prospect for improvement is lacking. Miscellaneous fabricators lend moderate support.

New York—Plate prices are somewhat firmer, although still requiring further test. Locally, the proposal to revise the method of quoting prices on fabricated-in-transit tonnage has little direct bearing, since most material is moved from shops to erection point by trucks. Truck-


FARREL-SYKES GEARS
Meet the Hardest Demands of Power Shovel Service
In many Marion Power Shovels Farrel-Sykes Gears have been operating from six to eight years, twenty-four hours a day, without giving the slightest trouble. These gears operate continuously as part of the hoist mechanism when the machine is digging. They act as propelling gears when the shovel is moved.
In hoisting, the Farrel-Sykes Gears take a load varying from zero to maximum, six to ten times a minute. A single reduction of Farrel-Sykes continuous tooth herringbone gears makes the hoisting unit more efficient than when a double unit of one herringbone and one spur reduction is used.
The use of Farrel-Sykes Gears reduces to the minimum the space required in shovel design. They help assure smooth, quiet, rapid operation without breakdowns.
Engineering resourcefulness, precision manufacture and the inherent superiority of Farrel-Sykes Gears are responsible for the successful solution of this drive problem, just as they have been for a wide variety of other applications in every branch of industry.
View of part of operating machinery of Marion Type 4121 shovel, showing Farrel-Sykes single reduction continuous tooth herringbone gears.
FARREL-BIRMINGHAM COMPANY, INC.
344 VULCAN STREET, BUFFALO, N. Y.

ing allowances here generally were discarded by mills some time ago. However, in some other districts the move should have a strengthening effect on base prices. The maritime commission will take bids July 11 on a number of C-1 vessels, ten or more probably to be bought. Local transportation board is expected to buy 150 to 300 subway cars.

Philadelphia—The navy has postponed bids on 20,000 tons of plates, sheets and strip, principally plates, for the Philadelphia and Brooklyn yards until July 13. About 20 per cent of the 16,000 tons required for the battleship SOUTH DAKOTA, for which the New York Shipbuilding Corp., has laid the keel, has been shipped. The price situation still is somewhat clouded, but export quotations are considerably firmer. It is indicated eastern plate makers will be invited to join the international cartel, but export quotas are believed unsatisfactory.

Approximately 10,000 tons of plates will be required for two ships placed by Seatrain Lines Inc., with Sun Shipbuilding & Dry Dock Co., Chester, Pa.

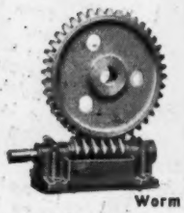
Birmingham, Ala. — Output of plates remains at approximately 60 per cent, a considerable portion going to tank manufacturers. Prospects continue good for increased plate production this quarter.

San Francisco—Little of importance transpired in the plate market and both awards and new inquiries were limited to lots of less than 100 tons. Bookings for first half totaled 18,084 tons, compared with 15,257 tons for the same period a year ago.

Seattle—Local officials have not announced whether a portion of the Warren avenue water main extension will go steel for the 24-inch pipe, general contract placed with Argentieri & Colarossi, Seattle. If steel, 500 tons of plates will be involved. Important plate jobs are few and some of the larger fabricating plants are idle.

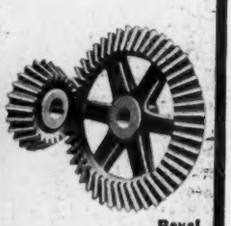
ACCURACY for SALE

Spur


Worm

Herringbone

Mitre


Bevel

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W. A. JONES FOUNDRY & MACHINE CO.
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ANTI-FRICTION PILLOW BLOCKS • PULLEYS • FRICTION CLUTCHES • TRANSMISSION APPLIANCES

Plate Contracts Placed

275 tons, tunnel under Chicago river, Chicago, to Grayer Tank & Mfg. Corp., East Chicago, Ind.

240 tons, tunnel lining, Oakwood connecting sewer, Detroit, to Youngstown Steel Car Corp., Youngstown, O.

175 tons, roofs for two standpipes, city of Pittsburgh, to Pittsburgh-Des Moines Steel Co., Pittsburgh.

145 tons, 200-foot stack, Central New York Power Corp., Oswego, N. Y., to Chicago Bridge & Iron Co., Chicago.

135 tons, water tank for McChord Field, Wash., to Chicago Bridge & Iron Co., Chicago.

100 tons, outlet pipe, bureau of reclamation, Fresno, Mont., to Thompson Mfg. Co., Denver.

Bars

Bar Prices, Page 82

Cleveland — Bar orders make a favorable showing despite day-to-day variations. Miscellaneous consumers comprise an important outlet in view of the relatively light needs of automotive interests. The revised schedule of quantity differentials now is in effect to buyers of all size quantities, but some shipments remain to be made against business taking the old deductions.

Chicago—Carbon and alloy bar demand was affected by the holiday. Farm equipment needs are light as a result of many plant shutdowns, but with resumption of operations imminent, heavier ordering is in prospect. Automotive requirements also are expected to tend upward within the next 30 days.

New York—Merchant bar business has revived since the holiday to the late-June rate. Withdrawal of quantity deductions July 1, with an ac-

companying net increase of $1 a ton on large lots, resulted in little anticipatory buying.

Philadelphia—Carbon bar business is as much as 100 per cent ahead of last year, and some gain is indicated over June. Alloy bar demand also is excellent compared with a year ago. Most business is miscellaneous in character. Sellers maintain that the advance of $1 a ton on large quantities is being applied, though there is little buying of that size.

Buffalo — Demand is sustained largely by business from general manufacturing consumers. Automotive releases are irregular, with new model requirements still light.

Birmingham, Ala.—Concrete reinforcing, as usual, supplies most bar tonnage. Production is estimated at about 65 per cent.

Pipe

Pipe Prices, Page 83

Cleveland — Some letdown in tubular business from the active June rate, when line pipe orders helped swell total tonnage, is not unlikely this month, although standard pipe is expected to continue to move in good volume for building work. Prices on less-carload lots of oil well casing and tubing have been increased to 10.6 per cent over quotations on carload lots. The differential formerly was 5 per cent.

New York—Cast pipe volume is in small miscellaneous lots as a rule, with no large tonnages up for estimates. A sewer, Yonkers, N. Y., requires close to 150 tons while water and sewer lines, Brentwood hospital, Long Island, N. Y., take close to 100 tons, bids July 15. Cast pipe prices are generally firm.

Detroit—City has awarded 30,000 feet of cast iron pipe to Central Equipment Sales Co., agent for International Selling Corp., Nancy, France. This action sustains a veto by Mayor Reading of a former award of one-third of this tonnage to Lynchburg Foundry Co., Lynchburg, Va., and the remainder to the French company.

Birmingham, Ala.—The five-day week is being maintained generally by pipe shops, although bookings are not individually large.

Seattle—University district, Seattle, plans improvements in immediate future, $49,000 available. Award is still pending for 145 tons of 3 to 6-inch for Columbia City, Oreg. District 58, Seattle, bids July 7, will buy several hundred tons of steel pipe for proposed improvement.

San Francisco—The only cast iron pipe award of size went to United States Pipe & Foundry Co., 165 tons for Burbank, Calif. An award of 793 tons of plain end seamless pipe for Long Beach, Calif., is expected to be placed with several interests soon. Bookings for first half aggregated 16,922 tons, compared with 17,707 tons for the corresponding period in 1938.

Cast Pipe Placed

190 tons, 6-inch, for Spokane, to United States Pipe & Foundry Co., Burlington, N. J.

165 tons, 4 to 8-inch, Burbank, Calif., to United States Pipe & Foundry Co., Burlington, N. J.

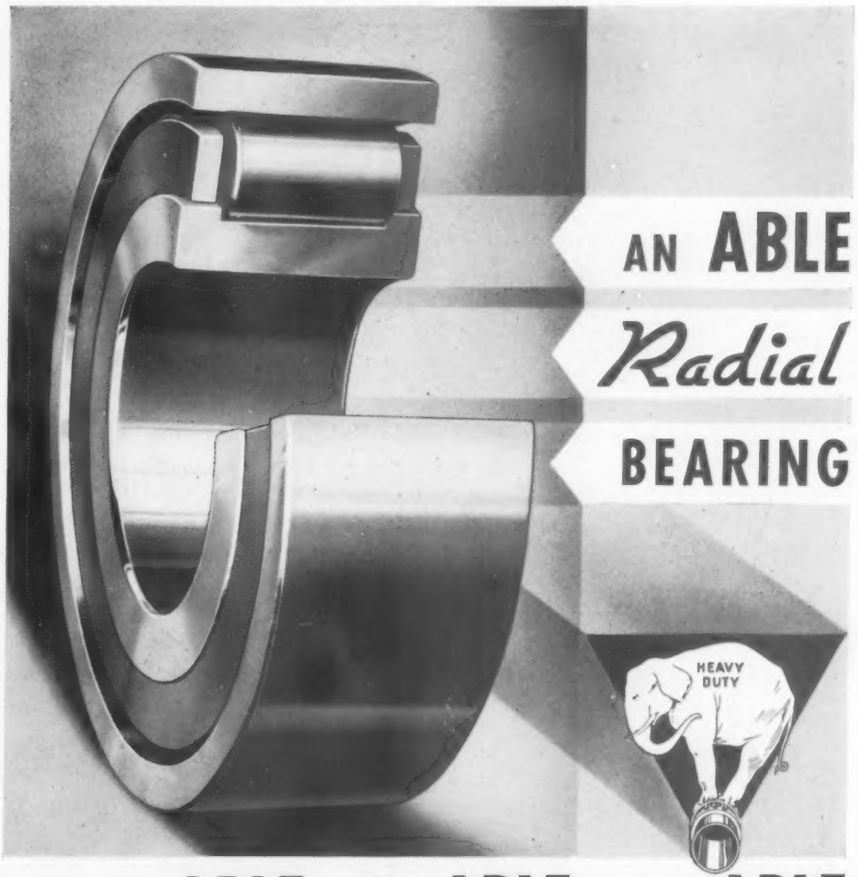
Cast Pipe Pending

900 tons, Warren avenue improvement, Seattle, Wash.; bids being taken.

250 tons, Vista Heights district improvement, Salem, Oreg., plans being prepared for cast iron, steel or transite pipe.

247 tons, 4 to 12-inch, Santa Monica, Calif.; bids opened.

150 tons, 4 and 6-inch, alternate, transite, Gilbert district, Portland, Oreg.; bids July 10 to H. L. Leach, secretary.



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Pacific Coast Office: 321 W. Pico St., Los Angeles

AMERICAN
Heavy-Duty ROLLER BEARINGS

Wire

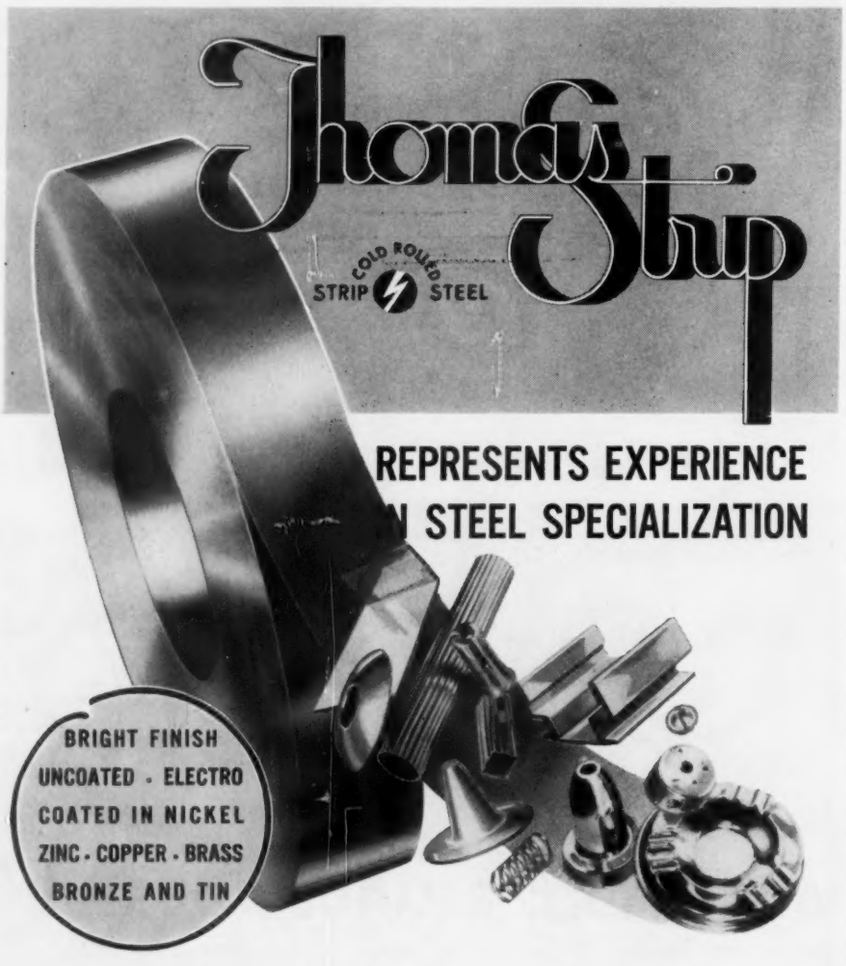
Wire Prices, Page 83

Cleveland—Some letdown in business is looked for this month, following heavy buying in June which brought volume to the year's best level. Activity in merchant products ordinarily is quieter in July, while relatively slow demand for manufacturers' wire from the automotive industry is in prospect for several weeks. Outlook for latter part of this quarter is fairly bright. Merchant products have attained the best price stability in many months.

Chicago—Wire and wire products are in steady demand, except for a letdown over the holiday. June business compared favorably with May. Nails and reinforcing mesh are moving well. Automotive demand is not expected to improve materially until August.

New York—Although spotty, with production schedules uneven, wire specifications are holding. Some increases are noted in manufacturers' wire, including scattered specifications from the automotive industry. Demand for spring wire from the furniture trade is holding better than expected. Releases include 200 tons for automobile seats. Rope buying is slow, but steady. Incoming volume in specialties is uneven, but well diversified. Prices are generally steady.

Birmingham, Ala.—Diversification continues in wire. Manufacturers' wire is in steady demand, and other products generally maintain the pace set two weeks ago.



By specializing on manufacturers' needs for better qualities and greater economies, Thomas Steel has become one of the largest steel finishing plants in the United States. We are able to furnish cold rolled strip steel to very definite specifications of gauge . . width . . length . . edge . . temper and physical properties. Thomastrip is available in a wide variety of high quality finishes.

THE THOMAS STEEL COMPANY · Warren, Ohio

Rails, Cars

Track Material Prices, Page 83

Inquiry for 150 to 300 subway cars at New York is expected to be issued in a month or so by the board of transportation, for the municipally owned subway system. This is the only sizable car list in prospect.

Domestic freight car awards in June involved 1324 units, compared with 2051 cars in May, and brought the total for the first six months to 9532, compared with 8021 in the first half of last year, 45,985 in the first six months of 1937 and 28,109 in the corresponding period in 1936. The outstanding award of the past month involved 1110 cars for the Western Maryland.

Further comparisons follow:

	1939	1938	1937	1936
Jan.	3	25	17,806	2,050
Feb.	2,259	109	4,972	6,900
March	800	680	8,155	632
April	3,095	15	9,772	4,427
May	2,051	6,014	4,732	8,900
June	1,324	1,178	548	5,200
6 mos.	9,532	8,021	45,985	28,109
July		0	1,030	7,229
Aug.		182	1,475	225
Sept.		1,750	1,216	1,750
Oct.		2,537	1,355	2,210
Nov.		1,232	275	1,550
Dec.		2,581	275	23,450
Total		16,303	51,611	64,523

Locomotives Placed

Kansas City Southern, one 1000-horsepower diesel-electric switch engine, to Electro-Motive Corp., La Grange, Ill.

Phelps Dodge Corp., one 600-horsepower diesel-electric locomotive, to Electro-Motive Corp., La Grange, Ill.

Florida East Coast, two 2000-horsepower diesel-electric locomotives, to Electro-Motive Corp., La Grange, Ill.

Car Orders Pending

New York board of transportation, 150 to 300 subway cars; contemplated.

Rail Orders Pending

St. Louis Southwestern, 20 miles 112-pound rails; court permission granted.

Shapes

Structural Shape Prices, Page 82

New York—Plain structural material prices are firmer with shading less in evidence. Buying, however, is light, notably by small fabricators who are not carrying stock and buying as they book work. Outstanding pending projects, is the Raritan river bridge, Woodbridge, N. Y., involving 9443 tons, bids in.

Pittsburgh—Awards have been fairly heavy recently, but there was a slight dip in new project tonnages. Although some private jobs are coming out, it is evident that most current tonnage is not on new jobs but on new sections of large public jobs already under way. However, there is still enough unawarded tonnage to carry local mills through the balance of this year on a reasonably steady basis.

Cleveland—Inquiries and awards from public sources lead with little improvement in private projects. Fabricators are fairly busy on tonnage booked through June. Bids went in late last week on 2100 tons for Cedar street bridge, Youngstown, O., and 900 tons for the Central high school, Cleveland. Hunter Construction Co., Youngstown, is low on the former and Shermer Petterson, Cleveland, is low on the school job. Prices are unsteady.

Chicago—S. A. Healy Co., New York, is low on Chicago subway contract S-3, involving about 1900 tons of structurals and 8000 tons or more of steel beam ribs and liner plates. Recent holiday had a quieting effect on the market, as no closings were announced and no important new projects appeared. Awards, however, are well maintained, with no downward tendency yet discernible. Considerable PWA work is on the prospective list.

Philadelphia—Structural mills report July displaying further slight up-trend which has been evident since March. Appearance of more industrial work has given the market a better appearance, including a plant addition for Waynesboro, Pa., machine tool maker. Prices on plain shapes are firmer, but still under published levels.

Buffalo—Although the number of new projects coming up for bids tends to diminish, activity continues favorable as backlogs remain heavy. Six schools calling for total tonnage of about 2700 tons are among the pending projects. Counting jobs on which general contracts have been awarded, fabricators estimate approximately 12,000 tons to be rolled in the near future.

San Francisco—Demand continues quiet, the only large letting going to Moore Drydock Co., 480 tons, for the new plant of the Federated Metals Co., San Francisco. Awards aggregated 914 tons, bringing the first half total to 68,718 tons, compared with 67,050 tons in 1938. Bids have just been opened on 328 tons for eight sliding gates for the Hansen

Shape Awards Compared

	Tons
Week ended July 8	21,143
Week ended July 1	14,850
Week ended June 24	17,494
This week, 1938	13,606
Weekly average, year, 1938	21,568
Weekly average, 1939	22,360
Weekly average, June	17,590
Total to date, 1938	444,301
Total to date, 1939	603,722

Includes awards of 100 tons or more.

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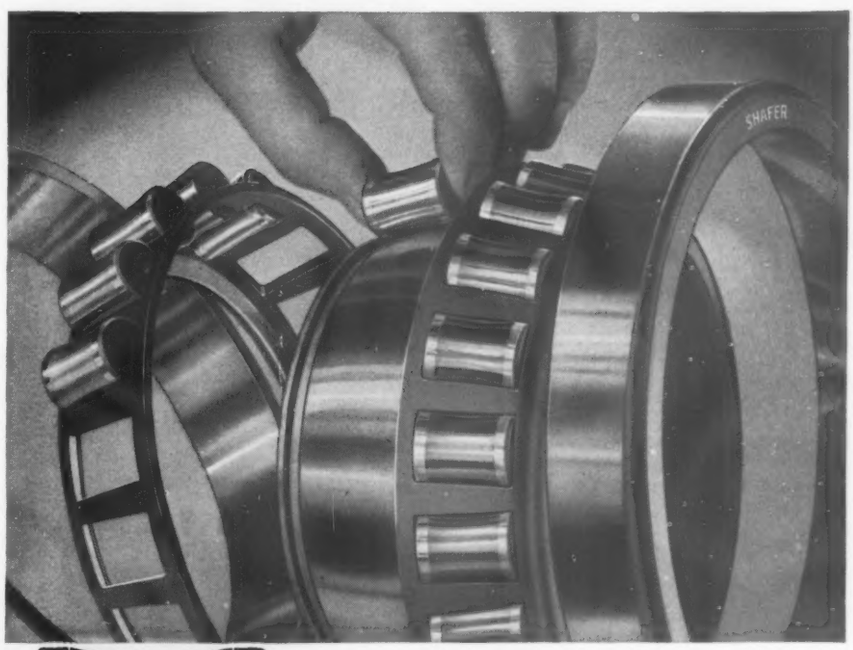
design provides thrust capacity as an integral function of the simple, compact basic design. Radial or thrust loads alone, or combined loads in any proportion, are provided for without the need for additional features. Shafer self-alignment maintains free rolling action and load capacity unchanged by shaft deflection, shock, or misalignment.

SHAFER BEARING CORPORATION • 35 East Wacker Drive, Chicago



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SHAFER *Self-Aligning* **ROLLER BEARINGS**

dam, Los Angeles, and 300 tons for tunnel ribs for the treasury department, Los Angeles.

Shape Contracts Placed

4200 tons, east building, municipal center, Washington to American Bridge Co., Pittsburgh.

1400 tons, curb angles, 100,000 feet, New York, to Phoenix Bridge Co., Phoenixville, Pa.

1000 tons, new convention hall, Buffalo, to Bethlehem Steel Co., Buffalo.

1000 tons, bridge, Plumb beach channel, Brooklyn, N. Y., to Fort Pitt Bridge Works, Pittsburgh.

845 tons, Allegheny Mountain tunnel, Somerset, Pa., to Commercial Shearing & Stamping Co., Youngstown, O.

820 tons, rock storage building, National Gypsum Co., East 150th street, New York, to Ingalls Iron Works, Birmingham, Ala.

820 tons, Coulee power house, to American Bridge Co.

730 tons, erection shop, Landis Tool Co., Waynesboro, Pa., to Belmont Iron Works, Eddystone, Pa.

700 tons, gymnasium, Seton Hall college, South Orange, N. J., to Bethlehem Steel Co., Bethlehem, Pa.

670 tons, bridges, Summit and Richland county, Ohio, to Burger Iron Co., Akron O.

500 tons, theater, Broadway and Forty-third street, New York, to Lehigh Structural Steel Co., Allentown, Pa.

480 tons, building for Federated Metals Co., San Francisco, to Moore Drydock Co., Oakland, Calif.

450 tons, grade crossing elimination bridges, Tottenville, N. Y., for Staten Island Rapid Transit railway, to Bethlehem Steel Co., Bethlehem, Pa.

445 tons, South Damen avenue viaduct, Chicago, to American Bridge Co., Pittsburgh.

357 tons, three bridges, route 6, sec. 11A, Morris county, New Jersey, to American Bridge Co., Pittsburgh.

300 tons, bridge requirements, Texas, Texas & Pacific railroad, to Virginia Bridge Co., Roanoke, Va.

300 tons, approach to bridge, Rankin, Pa., for Allegheny county, to Bethlehem Steel Co., Bethlehem, Pa.

265 tons, bridge, section 201F, East Alton, Ill., to American Bridge Co., Pittsburgh.

265 tons, warehouse and factory addition, for Montgomery Ward & Co., Chicago Heights, Ill., to Joseph T. Ryerson & Son Inc., Chicago.

260 tons, state highway bridge FAP-740-C, Humboldt, Iowa, to American Bridge Co., Pittsburgh.

255 tons, bridge, section 110F-1, Rock Falls, Ill., to American Bridge Co., Pittsburgh.

250 tons, building, Procter & Gamble Co., Quincy, Mass., to New England Structural Steel Co., Everett, Mass.; through James Stewart & Co., New York.

250 tons, power house, for Keystone Steel & Wire Co., Peoria, Ill., to Mississippi Valley Structural Steel Co., Decatur, Ill.

230 tons, alterations to Buhl hospital, Sharon, Pa., to Sause Structural Steel Co.

225 tons, music building, state normal school, Fredonia, N. Y., to Erie Concrete & Steel Co., Erie, Pa.

225 tons, repairs to bridges, various locations, for Chicago, Milwaukee, St. Paul & Pacific railroad, to Worden-Allen Co., Milwaukee.

225 tons, addition, Owens-Illinois Glass Co., Bridgeton, N. J., to Belmont Iron Works, Philadelphia.

220 tons, grade separation, Oswego, N. Y., to American Bridge Co., Pittsburgh; through Hockensmith Contracting Co. Inc., Albany.

210 tons, bridge FAGH 304-C, Platte county, Missouri, to St. Joseph Structural Steel Co., St. Joseph, Mo.

200 tons, cell blocks, Elmira reformatory, Elmira, N. Y., to American Bridge Co., Pittsburgh.

200 tons, bridges, various locations, for Atchison, Topeka & Santa Fe railway, to Bethlehem Steel Co., Bethlehem, Pa.

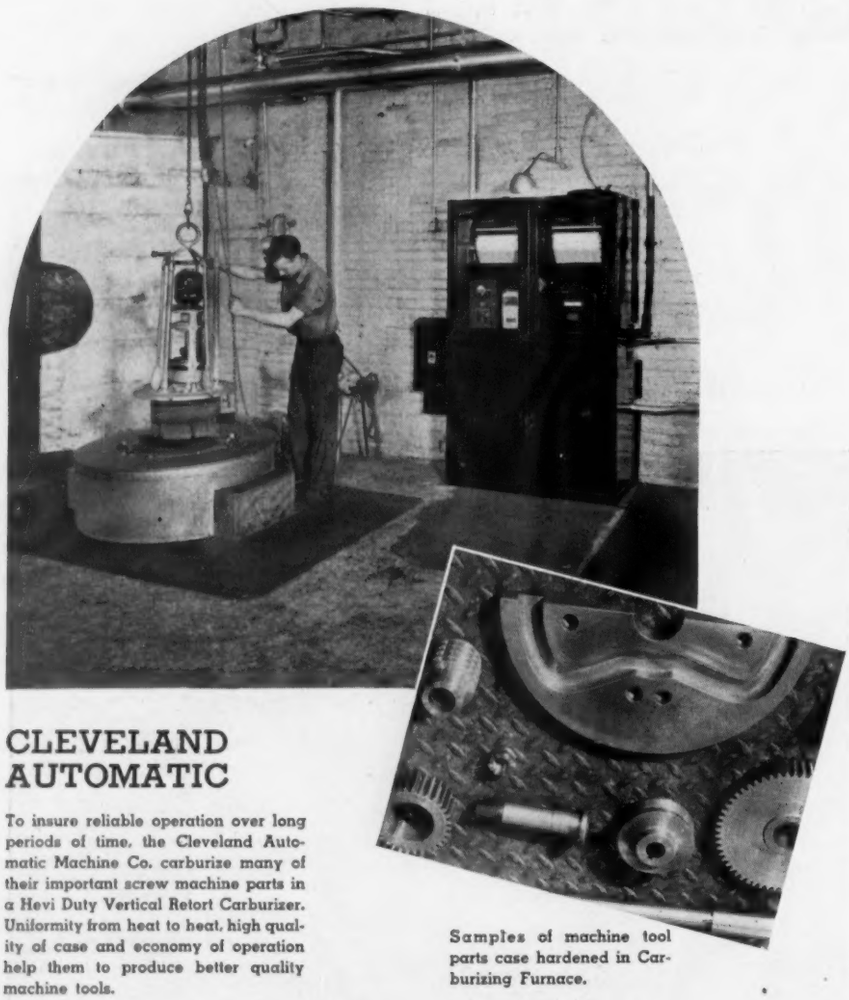
190 tons, repairs to bridge 455, Snohomish, Wash., for Great Northern railway, to American Bridge Co., Pittsburgh.

190 tons, power plant, Kings Park hospital, Long Island, N. Y., to Weatherly Steel Co., New York.

180 tons, laboratory and heating plant, Peoria, Ill., for U. S. department of agriculture, to Joseph T. Ryerson & Son Inc., Chicago.

175 tons, four 64-foot deck plate girder spans, Great Northern railroad, St. Paul, to American Bridge Co., Pittsburgh.

170 tons, laboratory building for power plant, Dayton, O., for U. S. government



CLEVELAND AUTOMATIC

To insure reliable operation over long periods of time, the Cleveland Automatic Machine Co. carburize many of their important screw machine parts in a Hevi Duty Vertical Retort Carburizer. Uniformity from heat to heat, high quality of case and economy of operation help them to produce better quality machine tools.

Samples of machine tool parts case hardened in Carburizing Furnace.

Send for Bulletin HD-93. It describes the Vertical Retort Carburizer.

HEVI DUTY ELECTRIC COMPANY

HEAT TREATING FURNACES HEVI-DUTY ELECTRIC EXCLUSIVELY

TRADE MARK REGISTERED U. S. PAT. OFFICE

MILWAUKEE, WISCONSIN

to Burger Iron Co., Akron, O.

165 tons, tainter gates and bridges, Lower Colorado River authority, gates to Muskogee Iron Works, Muskogee, Okla., bridges to Mosher Steel Co., Dallas, Tex.

160 tons, bridge, contract 39-14-A, circumferential highway, New York, to Bethlehem Steel Co., Bethlehem, Pa.; through Harlem Contracting Co., New York.

160 tons, state bridge 585, Johnson Creek, Wis., to Milwaukee Bridge Co., Milwaukee.

160 tons, enameling plant, Dixie Foundry Co., Cleveland, Tenn., to International Steel Co., Evansville, Ind.

155 tons, bridge FAS-850-C, Greene county, Missouri, to Missouri Valley Bridge & Iron Co., Leavenworth, Kan.

155 tons, bridge, section SP-1672-3, Jefferson county, Wisconsin, to Milwaukee Bridge Co., Milwaukee.

150 tons, state bridge 29, Cecil, Wis., to Bethlehem Steel Co., Bethlehem, Pa.

140 tons, lime furnace, Tennessee Valley, authority, Sheffield, Ala., to Nashville Bridge Co., Nashville, Tenn.

136 tons, Village bridge over St. Georges river, Warren, Me., to American Bridge Co., Pittsburgh; Edgar Cyr Co., Waterville, Me., general contractor. Bancroft & Martin Rolling Mills Co., Portland, awarded 35 tons reinforcing bars.

135 tons, sheet piling and miscellaneous, retaining wall for Seattle, to Bethlehem Steel Co., Seattle.

110 tons, building, Schering Corp., Union, N. J., to Dayton Iron Works, Newark, N. J.

110 tons, state bridge, Princeton, Ill., to Bethlehem Steel Co., Bethlehem, Pa.

105 tons, state bridge, Chillicothe, Ill., to Bethlehem Steel Co., Bethlehem, Pa.

100 tons, industrial warehouse, Seattle, to Isaacson Iron Works, Seattle.

Shape Contracts Pending

9443 tons, superstructure Raritan river bridge; Bethlehem Steel Co., Bethlehem, Pa., low, bids July 7. Includes 200 tons steel castings, 29 plate girder spans from 84 feet 6 inches to 250 feet, total length 4386 feet.

2200 tons, Bascule bridge, Mill Basin, department of parks, New York; Reiss & Weinser Inc., New York, low.

2100 tons, Cedar street bridge, Youngstown, O.; Hunter Construction Co., Youngstown, low.

1900 tons, Chicago subway contract S-3; low bidder, S. A. Healy Co., New York. Also involves over 8000 tons, beam ribs and liner plates.

1100 tons, highway bridge 12-A, Pennsylvania turnpike, Bedford county, Pennsylvania.

1000 tons, Takser housing project, Philadelphia.

1000 tons, viaduct, Cranston Heights, Del.; bids July 19.

900 tons, Central high school, Cleveland, Shirmer Peterson Co., Cleveland, low.

900 tons, state highway bridge, FA—route 141, section 110-F, Galt, Ill.

858 tons, bridge, Delaware river, Schahola, Pa.; bids July 14.

800 tons, state highway bridge, Galt, Ill.

800 tons, grade crossing project, Pike county, Pennsylvania—Sullivan county, New York; bids to state highway department, Harrisburg, Pa., July 14.

695 tons, factory building, Landis Tool Co., Waynesboro, Pa.

550 tons, welded steel frames, unknown location, for E. W. Bliss Co., Brooklyn, N. Y.

500 tons, National Oil Co., Harrison, N. J.

500 tons, viaduct, Independence, Kans., for state.

450 tons, shipways, New York Shipbuilding Corp., Camden, N. Y.

450 tons, viaduct, Erie county, Pennsylvania; bids to state highway department, Harrisburg, Pa., July 14.

350 tons, state bridge, South Licking river, Falmouth, Ky.

330 tons, roasting building, for New Jersey Zinc Co., Palmerton, Pa.

328 tons, eight slide gates, United States engineer office, Los Angeles, proposal 226; Consolidated Steel Corp., Los Angeles; low.

300 tons, warm house for fruit and produce terminal, Chicago, for Chicago, Rock Island & Pacific railroad.

290 tons, plant addition, Scholler Bros., Philadelphia; Erwin & Leighton, Philadelphia, general contractor.

272 tons, outlet works and other items, Wicklup dam, Deschutes project, and Crane Prairie project, Oregon state; bids in at Bend, Oreg., government to furnish materials.

243 tons, bridge, Lewis county, Washington; bids July 11.

225 tons, state bridge 5475, LaCrescent, Minn.

NOW!

Anti-Friction Efficiency . . . .

FOR EVERY LIGHT-DUTY APPLICATION AT AN EXCEPTIONALLY Low Cost

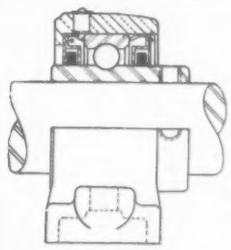
Here, at last, is a ball bearing pillow block which makes anti-friction efficiency economically practical for every type of light-duty application!

Substantially constructed—smooth in performance, yet exceptionally low in cost. The industry has been waiting for a "cost-design" pillow block like this . . . and Ahlberg engineering has met the need! Get the complete "dope" on this remarkably efficient bearing, immediately. Send for the Bulletin shown at the right.

AHLBERG BEARING COMPANY

Manufacturers of CJB Master Ball Bearings

3015 WEST 47TH STREET, CHICAGO, ILLINOIS



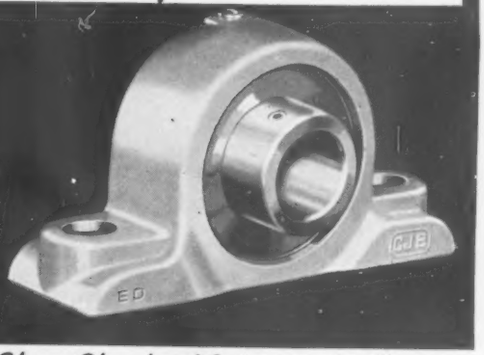
Features of AHLBERG LIGHT-DUTY PILLOW BLOCK (Series ED)

- √ ALL-METAL CAST HOUSING
- √ PRECISION TYPE BEARING
- √ NEOPRENE FRICTIONLESS SEALS, impervious to oil and grease.
- √ LONG-WEARING SEAL DESIGN—protects bearing, retains lubricant and insures long bearing life.

ALSO AVAILABLE IN SILENT, RUBBER-INSULATED TYPE

WRITE for this Bulletin which gives detailed information on "SERIES ED" pillow blocks, shaft sizes, prices, construction, etc.

CJB by Ahlberg PILLOW BLOCKS



Meet us at the Machine Tool Show, Cleveland Oct. 4-13. Booth 2115.

225 tons, extension to building, for Revere Copper & Brass Co., Rome, N. Y.

200 tons, Division street bridge, Youngstown, O.; Atlas Engineering, Youngstown, low.

170 tons, auditorium, Oberlin college, Oberlin, O.; bids in.

165 tons, gymnasium, South high school, Youngstown, O.; bids July 10.

150 tons, state highway bridge RC-4038-39, Catskill, N. Y.

140 tons, underpass, Bismarck, N. Dak., for state.

115 tons, bridge, Rockcastle river, Laurel county, Kentucky, for state.

100 tons, plant addition, American Can Co., Vernon, Calif.; Columbia Steel Co., San Francisco, low.

100 tons, addition, Henry Disston Sons Co., Philadelphia; bids in.

Reinforcing

Reinforcing Bar Prices, Page 83

New York—Substantial increase in highway and bridge awards for New York state is outstanding in reinforcing steel requirements, several hundred tons having been placed under contract covering projects bid last month. Construction requirements, however, are lagging with awards light, being limited to small lots mostly. Prices are steadier, but subject to little test.

Pittsburgh—Prices have firmed somewhat, although there are some weak spots. Awards are in good volume including several private jobs. Although there is a decline in inquiries, awards are steady.

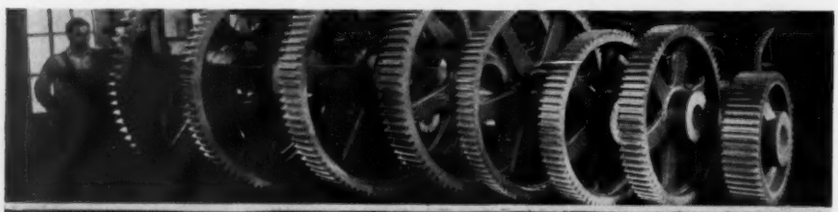
Cleveland—Fabricators are fairly busy on a number of school jobs placed during June. No improvement has been noted from private sources. The outstanding job pending is 1300 tons, for the Columbus road bridge, here, bids July 13. Prices have failed to stiffen.

Chicago—Activity is still brisk, being affected only slightly by the recent holiday. There are no signs of a tapering in volume of inquiries, with several new jobs coming up ranking with some of the largest so far this year. Bids have been opened on Chicago subway contract S-3, involving approximately 3700 tons. Little price talk is being heard, for although in certain cases concessions are being made which do not meet whole-hearted approval of the trade, general quotations have been fairly satisfactory.

Philadelphia—Volume of bar business has improved somewhat, with considerably larger number of jobs before the trade, involving a few tons to several hundred tons.

Buffalo—Augmenting current activity are several projects calling for fairly large tonnage. An award of 1320 tons for a factory-warehouse addition to Washburn-Crosby division plant of General Mills Inc., here, to Bethlehem Steel Co., Bethlehem, Pa., was the largest job in some time. However, this figure will be passed when bids are opened July 10 on a 1600-ton channel improvement project for the United States army, Hornell, N. Y.

Seattle—Public works require-



Neloy flame hardened industrial Gears and Track wheels

Note the discoloration on the flame-hardened surfaces of the gears shown above . . . An unretouched photograph.

You have at your command, when you do business with National-Erie, a wide range of gear cutting equipment for the production of spur, bevel, mitre, Sykes continuous Herringbone gears . . . The complete facilities of modern machine shops manned by expert machinists . . . Moreover, you have heat-treating facilities for fully quenched gears, which together with electric and open-hearth furnace foundry facilities, permit complete control of the manufacture of the materials you order . . . As you note above, a typical group of diversified industrial Neloy gears and crane track wheels for Neloy Flame Hardening treatments No. 10A and No. 10B . . . Make your source of supply for special steel castings and finished parts for your equipment, the National-Erie Corporation . . . Bulletins No. 5 and No. 6 are worth having on file for constant reference . . . They are yours for the asking.

NATIONAL-ERIE
CORPORATION
ERIE, PA., U.S.A.

Concrete Bars Compared

	Tons
Week ended July 8	6,828
Week ended July 1	10,819
Week ended June 24	15,003
This week, 1938	19,358
Weekly average, year, 1938	6,959
Weekly average, 1939	10,338
Weekly average, June	10,667
Total to date, 1938	167,761
Total to date, 1939	279,125

Includes awards of 100 tons or more.

ments dominate demand, although lots of less than 100 tons are more numerous, due to improved construction activity. Bethlehem Steel Co. was awarded 458 tons for the Roza project by the reclamation bureau.

Reinforcing Steel Awards

1955 tons, housing project, Memphis, Tenn., to Jones & Laughlin Steel Corp., Pittsburgh.

1000 tons, soap factory, Procter & Gamble, Quincy, Mass., to Truscon Steel Co., Youngstown, O.; James Stewart & Co., New York, contractor.

600 tons, sewage disposal plant, Waterloo Iowa, to Truscon Steel Co., Pittsburgh.

500 tons, dike, Connecticut river flood control, East Hartford, Conn., to Truscon Steel Co., Youngstown, O.; M. A. Gammino Construction Co., Providence, R. I., general contractor.

458 tons, Roza irrigation project, Washington state, to Bethlehem Steel Co.

400 tons, new convention hall, Buffalo, to Truscon Steel Co., Buffalo.

295 tons, section 2, Pennsylvania turnpike, Westmoreland county, Pennsylvania, to Jones & Laughlin Steel Corp., Pittsburgh, through Electric Welding Co.; McCrady-Rogers Co., contractors.

270 tons, civic auditorium, Great Falls, Mont., to unnamed interest.

250 tons, telephone exchange building, Newtown, Mass., to Truscon Steel Co., Youngstown, O.; John Bowen Co., contractor.

200 tons, Lafayette building, Washington, to Bethlehem Steel Co., Bethlehem, Pa.

175 tons, sections 5 and 6, Pennsylvania turnpike, Westmoreland county, Pennsylvania, to Jones & Laughlin Steel Corp., Pittsburgh; George Vang Inc., contractor.

150 tons, oil storage tanks, Bayonne, N. J., to Bethlehem Steel Co., Bethlehem, Pa.; Graves & Quinn, contractors.

140 tons, addition, turret shop, Philadelphia navy yard, to American Steel Engineering Co., Philadelphia.

135 tons, Leavenworth, Wash., fish hatchery for reclamation bureau, to unstated interest.

100 tons, Y. M. C. A. building, Wilmington, Del., to Truscon Steel Co., Youngstown, O.

100 tons, bridge, Union, Conn., to Truscon Steel Co., Youngstown, O.; A. I. Savin Construction Co., contractor.

100 tons, plant, Fernando Valley Milling & Supply Co., Van Nuys, Calif., to unnamed interest.

Reinforcing Steel Pending

3700 tons, Chicago subway contract S-3; S. A. Healy Co., New York, low bidder.

1600 tons, channel improvement project, Hornell, N. Y., for United States army; bids July 10.

1400 tons, River Des Peres drainage works, University City, Mo.; Fred Schmitt Contracting Co., St. Louis, low.

875 tons, Great Salt Lake dam, Milwood, Okla.; Mittry Bros., Construction Co., Los Angeles, low.

823 tons, section 12A, Pennsylvania turnpike, Bedford county, Pennsylvania.

800 tons, Takser housing project, Philadelphia.

650 tons, state hospital and clinic, Danville, Ky.

603 tons, switch house, Commonwealth Edison Co., Chicago; bids in.

525 tons, dormitory, Northwestern university, Evanston, Ill.

500 tons, housing project, Honolulu, T. H.; bids opened.

445 tons, highway projects, New York state; bids July 26.

400 tons, contract 5, sewer plant, Springfield, Mass.; bids July 15.

350 tons, Illinois state highway work, highway department, Springfield, Ill.

330 tons, viaduct, Cranston Heights, Del.; bids July 19.

300 tons, joists and bars, Central high school, Cleveland; Shirmer Peterson Co., Cleveland, low.

250 tons, approaches to Snohomish river bridge, Washington state; Howard S. Wright, Seattle, general contractor.

225 tons, pump and blower house, Gary, Ind.

220 tons, bridge superstructure, contract MS-39-3C, Mill Basin, New York; bids in.

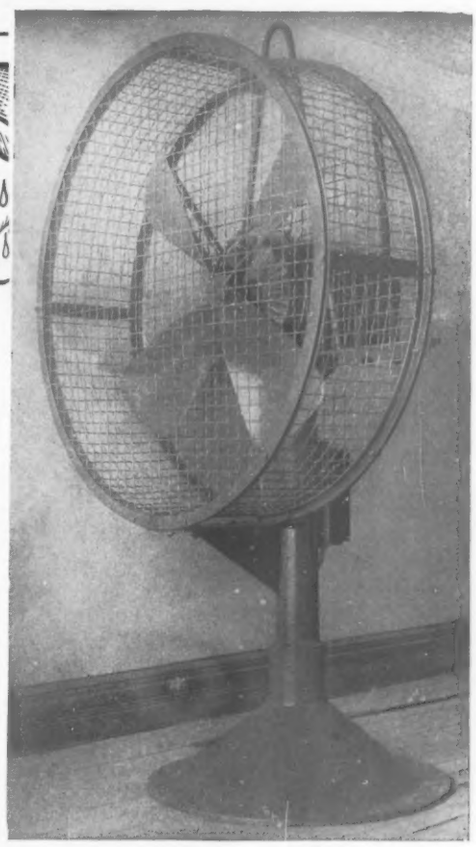
200 tons, factory, Atchison Elevator Co., Minneapolis.

200 tons, Cross island parkway, MC-3916, New York.

200 tons, grade crossing project, Pike county, Pennsylvania—Sullivan county, New York; bids to state highway department, Harrisburg, Pa., July 14.

130 tons, joists, garage, Halle Bros., Cleveland; J. E. Christain Co., Cleveland, general contractor.

HEAT INSIDIOUS THIEF OF MANPOWER



■ The sweat shop is damned by every honest employer as well as every honest worker—but what about "sweat shops" in a literal sense? Even in plants that are models for labor relations the most willing worker slows up when the heat gets him. You can keep your men cool with the TRUFLO MANCOOLER PORTABLE FAN. Leading steel plants use these fans in and around skelp furnaces, bar mills, tube mills, heat treating furnaces and other localities where intense heat wears men down—wears 'em down and lets them draw full pay for little better than half time. The psychological effect is sound, too; look after your men's comfort and they'll make better workers. A complete line of cooling fans, blowers, exhaust fans and wall fans.

Write at once for information

TRUFLO COOLING FANS

TRUFLO FAN COMPANY

HARMONY, PENNA. (Pittsburgh District) Phone: ZELIENOPLE 293

Behind the Scenes with STEEL

Dreams

■ With the little red line in the thermometer flirting around in the middle 90's, the humidity heavy enough to float a battleship, and our white shirt resembling a wet wash rag we are showing acute signs of vacationitis. Night after night, now, we're down on the living room floor studying road map after road map and pouring over Ackerman's Hunting & Fishing Guide for spots where the muskies wait and all alibis are out. Boy, oh boy, we're going to get that big baby down in the lower lake this year, or else!

Serious Illness

■ The other day in Chicago a scrap broker called up a rival in the business and explained: *Couldn't go to the office today. I'm home sick with a sore throat. Let's play golf this afternoon.*

Pains Of Accuracy

■ These editors of ours don't fool when it comes to accuracy and they'll go to any lengths to make sure a story is right before you see it. Last week we read 18 different letters, involving 4 persons, that were necessary to get permission, information and a good photograph for one of those innocent-looking illustrations that stand by themselves with only a couple of lines of type under them. Which is one reason we get such flattering compliments as came in today's mail from clear out in California: *Seven of us here read* STEEL *thoroughly every week. It is the most accurate and interesting source of information that comes to this office.*

Want To Be A Printer?

■ We heard just recently that Benjamin Franklin (of Almanac fame) is ready to stake you if you want to become a printer. In his will, versatile old Ben left $5000 to be loaned to worthy apprentices, but to get any of the money you must pay 4 per cent interest, have a job, a wife, and put up a first mortgage on Philadelphia real estate. Ben's trustees have never found anyone who can meet these conditions, needs the money, *and* wants to become a printer. Consequently the original five thousand bucks have mounted to the neat little total of $144,000. Would anyone down in Philly loan us a first mortgage for a few days?

50-Years

■ One of the nicest all round jobs we've seen in a long time is the Fiftieth Anniversary issue of the *New Departure News*. A lot of this anniversary stuff is just so much hokum, we've always believed, but here is a story of progress and personalities that gives you a lift. It is a human history of successful growth typical of no other country but these United States. Mr. F. G. Hughes, general manager, says on the opening page: "From nothing to have made much . . . to have done a better job each day . . . to have played the game fair . . . to have won the confidence of thousands of co-workers and customers, hence to have grown and prospered for fifty years, is an achievement." We agree.

Standouts

■ For a really beautiful piece of industrial advertising turn back to that knock-out spread Nitralloy has on pages 4-5, and for a headline that tells a story we'll take Hyatt Roller Bearing's "Jewels for Giants" on page 38.

Gulp!

■ But above all else right now, we'll take a nice, long, cold, sparkling Mint Julep with all the trimmings.

SHRDLU

113 tons, joists, Kentucky school, Cleveland; Carbone Construction Co., Cleveland, low.

100 tons, aeronautical engine laboratory, Philadelphia navy yard; bids July 12.

100 tons, shipway No. 2, Philadelphia navy yard; bids July 12.

100 tons, viaduct, Erie county, Pennsylvania; bids to state highway department, Harrisburg, Pa., July 14.

100 tons, East Thirty-eighth street, Tacoma, Washington state span; S. R. Gray, Puyallup, general contractor.

Pig Iron

Pig Iron Prices, Page 84

Cleveland—The season is restricting operations of some foundries, and pig iron shipments are moderately below the average of the past 60 days. Some jobbing plants continue busy, but output of automotive castings is lighter pending the resumption of work on new model parts. New business continues slow, only small lots being ordered.

Chicago—Good releases came in last week, bolstering hopes that July shipments may better those of June. Encouragement originates from prospects that automotive and agricultural casting requirements will tend upward. Heavier automotive releases are expected shortly, while a slight bulge in farm equipment needs already has been noted. Because of a number of two-week shutdowns at various farm equipment plants, their stocks of pig iron were left at a low point, presaging early replenishment. More buying and contracting has been noted recently.

New York—Heavier specifications are expected this week, as a number of consumers will resume operations after recent shutdowns for vacations and inventory-taking. Export inquiries, principally from Scandinavian countries, are resulting in little business.

Philadelphia — Shipments this month likely will dip under June, due to a number of foundry suspensions last week. However, the melt will expand shortly and the outlook for late summer and early fall is improved. Prices are firm. Placing of 1000 tons of iron for Shanghai has been delayed by current instability of exchange there.

Buffalo—Releases are off seasonally and sales are moderately lighter than a month ago. Foundries also report a letdown in orders, with average operations slightly less than three days weekly. Pig iron production is steady at 57 per cent, but some iron is being piled.

Cincinnati—Pig iron contracting is slow and for only minimum needs. Specifications indicate a maintenance of the melt this month near June levels which, in turn, were

better than May. Some old contracts are being extended into the current quarter.

St. Louis—Buying is confined to a few spot carloads. Melters already are largely covered by old commitments for a large part of this quarter and have no incentive from the standpoint of price to cover far ahead. June shipments were below May, although the last week's movement was the best of the month.

Birmingham, Ala.—Thirteen blast furnaces remain in operation, including seven for Tennessee and two each for Sloss, Woodward and Republic. Melters are optimistic as to prospects for increased production.

Toronto, Ont. — Business is retarded seasonally and new sales are small. Local melters are fairly well stocked and are out of the market, business being mostly with small users. Prices are firm and unchanged.

Scrap

Scrap Prices, Page 86

Pittsburgh—Scrap is quiet but very strong. Brokers' bids on railroad lists in some cases are as high as currently quoted mill prices, indicating expectations of a higher market. No. 1 steel remains $15 to $15.50, but there has been buying which indicates the low figure is getting out of line. Mill purchases above $15.50 remain to be authenticated.

Chicago—No. 1 steel is steady at $13.25 to $13.50, with dealers unwilling to sell for less than the lower end of the range and $13.50 representing the top figure for mill purchases. Steelmaking scrap is none too plentiful.

Philadelphia—The market is firm, sales of several thousand tons of leading grades having been made at current prices. A local steelworks purchased the July list of E. G. Budd Mfg. Co. at a reported price of $14.50, f.o.b., equivalent to a 25-cent premium over the present published delivery price. Offering prices against export contracts still are $13.75 for No. 2 and $15.25 for No. 1.

Detroit—Prices bid on most scrap grades on recent lists were 10 to 15 cents higher, exceptions being some specialties which were up about 50 cents. Bundled sheets, borings and turnings have been advanced 25 cents. The outlook is better, with steelmaking being increased.

Cincinnati—Prices are unchanged, but sentiment has been harmed by a sharp cut in steelmaking. However, dealers are resisting concessions. Country scrap is in light demand. Foundry needs tend to decline.

Milwaukee—City council will readvertise for bids on wrecking the former Illinois Steel Co. plant which the city acquired some time ago. The harbor commission will take bids, probably within a month. Bids opened May 3 showed Hyman-Michaels Co., Chicago, submitted the best offer, $131,160 for wrecking and salvage. Most valuable item is 25,000 tons of scrap.

Toronto, Ont. — Trading continues slow, with larger consumers unwilling to raise their bids. Heavy melting steel is moving fairly actively, and cast scrap is in demand. Low prices are restricting deliveries to local dealer yards.

Form New Scrap Firm

■ Pennsylvania Steel Scrap Co. has been organized by several men well known in western Pennsylvania scrap trade, Harry A. Kirchmann, Philadelphia, being president. Modernly equipped yards have been established at Conshohocken and Phoenixville, Pa.

Tin Plate

Tin Plate Prices, Page 82

Although tin mills are operating virtually unchanged on a daily basis, the holiday reduced last week's output to about 50 per cent. Some plants were down both Monday and

PAGE Hi-Tensile "G" has proved itself on thousands of jobs of many kinds. It has proved that it produces a tough, ductile weld that shows surprising elongation and is highly resistant to the effects of shock and strain.

Users value Hi-Tensile "G" for its smooth bead, its fast and easy working qualities, its ability to adapt itself to all current values and to the requirements of practically all types of work. They like all its features.

Ask your local Page distributor for complete information on Hi-Tensile "G" and other Page Welding Electrodes. He may be able to offer some helpful suggestions.

BUY ACCO QUALITY *in Page Welding Electrodes, Page Wire Fence, Tru-Lay Preformed Wire Rope, Reading-Pratt & Cady Valves, Campbell Abrasive Cutting Machines, American Chains (Welded and Weldless) and Wright Hoists.*

PAGE STEEL & WIRE DIVISION • MONESSEN, PENNSYLVANIA

See our exhibit, Metals Building, New York World's Fair

TRADE MARK

AMERICAN CHAIN & CABLE COMPANY, Inc.

AMERICAN CHAIN DIVISION • AMERICAN CABLE DIVISION • ANDREW C. CAMPBELL DIVISION • FORD CHAIN BLOCK DIVISION • HAZARD WIRE ROPE DIVISION • HIGHLAND IRON AND STEEL DIVISION • MANLEY MANUFACTURING DIVISION • OWEN SILENT SPRING COMPANY, INC. • PAGE STEEL AND WIRE DIVISION • READING-PRATT & CADY DIVISION • READING STEEL CASTING DIVISION • WRIGHT MANUFACTURING DIVISION • IN CANADA: DOMINION CHAIN COMPANY, LTD. • IN ENGLAND: BRITISH WIRE PRODUCTS, LTD. • THE PARSONS CHAIN COMPANY, LTD. • *In Business for Your Safety*

Nonferrous Metal Prices

Spot unless otherwise specified. Cents per pound.

July	Copper Electro, del. Conn.	Copper Lake, del. Midwest	Copper Casting, refinery	Straits Tin, New York Spot	Straits Tin, New York Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot, N.Y.	Nickel Cathodes
1	10.00	10.00	9.52½	48.80	48.50	4.85	4.70	4.50	20.00	12.00	35.00
3	10.00	10.00	9.52½	48.80	48.50	4.85	4.70	4.50	20.00	12.00	35.00
4—Holiday.											
5	10.00	10.00	9.52½	48.65	48.30	4.85	4.70	4.50	20.00	12.00	35.00
6	10.00	10.00	9.52½	48.70	48.35	4.85	4.70	4.50	20.00	12.00	35.00
7	10.25	10.25	9.87½	48.60	48.30	4.85	4.70	4.50	20.00	12.00	35.00

MILL PRODUCTS

F.o.b. mill base, cents per lb., except as specified. Copper brass products based on 10.12½c Conn. copper

Sheets

Yellow brass (high) 16.56
Copper, hot rolled 18.25
Lead, cut to jobbers 8.00
Zinc, 100 lb. base 9.75

Tubes

High yellow brass 19.31
Seamless copper 18.75

Rods

High yellow brass 11.92
Copper, hot rolled 14.75

Anodes

Copper, untrimmed 15.50

Wire

Yellow brass (high) 16.81

OLD METALS

Nom. Del. Buying Prices

No. 1 Composition Red Brass

New York 6.00-6.25
Cleveland 6.62½-6.87½
Chicago 6.50-6.75
St. Louis 6.25-6.50

Heavy Copper and Wire

New York, No. 1 ..... 8.00-8.12½
Cleveland, No. 1 ..... 7.87½-8.12½
Chicago, No. 1 ..... 7.87½-8.12½
St. Louis 7.75-8.00

Composition Brass Turnings

New York 5.25-5.50

Light Copper

New York 6.50-6.75
Cleveland 6.12½-6.37½
Chicago 6.50-6.75
St. Louis 6.25-6.50

Light Brass

Cleveland 3.62½-3.87½
Chicago 4.37½-4.62½
St. Louis 3.75-4.00

Lead

New York 4.00-4.25
Cleveland 3.75-4.00
Chicago 3.60-3.85
St. Louis 3.50-3.75

Zinc

New York 2.50-2.62½
Cleveland 2.00-2.25
St. Louis 2.25-2.50

Aluminum

Borings, Cleveland 6.25-6.50
Mixed, cast, Cleveland 7.75-8.00
Clips, soft, Cleveland 14.25-14.50
Misc. cast, St. Louis 7.00-7.25

SECONDARY METALS

Brass ingot, 85-5-5-5, less carloads 10.50
Standard No. 12 aluminum 11.75-12.00

AGILE MIRROR LENS for welders increase production, because they give 42% more visibility. Let us tell you more about them.

"HARD AS NAILS"

they said . . . but then, nails aren't so hard; if they wanted to express hardness, they should have said

HARD AS AGILE DARK GREEN RODS

Yes, one of the many welding electrodes manufactured by the AGILE people is the DARK GREEN ROD. It has a Brinell hardness of 570-600, and when the deposit is quenched it becomes as hard as glass. Because it matches the alloy and hardness of cutting edges, it is greatly employed in repairing castings, machining tools, punches, dies, plow-shares, etc. Just remember this: for highest hardness, use AGILE DARK GREEN RODS.

AMERICAN AGILE CORPORATION

CLEVELAND, OHIO

Warehouse

Warehouse Prices, Page 85

Cleveland — Despite the holiday interruption the turn of the month found sales maintained better than usual. The July outlook has been enhanced by absence of the full seasonal letdown the past two weeks.

Chicago — Seasonal factors have retarded business, but orders are expected at least to hold their own the remainder of July.

Philadelphia—Sales hold at the June rate, though orders are more numerous. Lighter products are most active. Prices are fairly steady.

Buffalo — Sales have held up better than expected, June volume being ahead of May and the best so far this year. Prices are steadier.

Cincinnati — Business has rebounded from the holiday letdown, giving promise that the June improvement will be sustained this month. Coal mining needs are an important factor in current demand.

St. Louis — The tendency in demand the past month was upward slightly, with buying well distributed although principally in sheets, bars, plates and structural shapes.

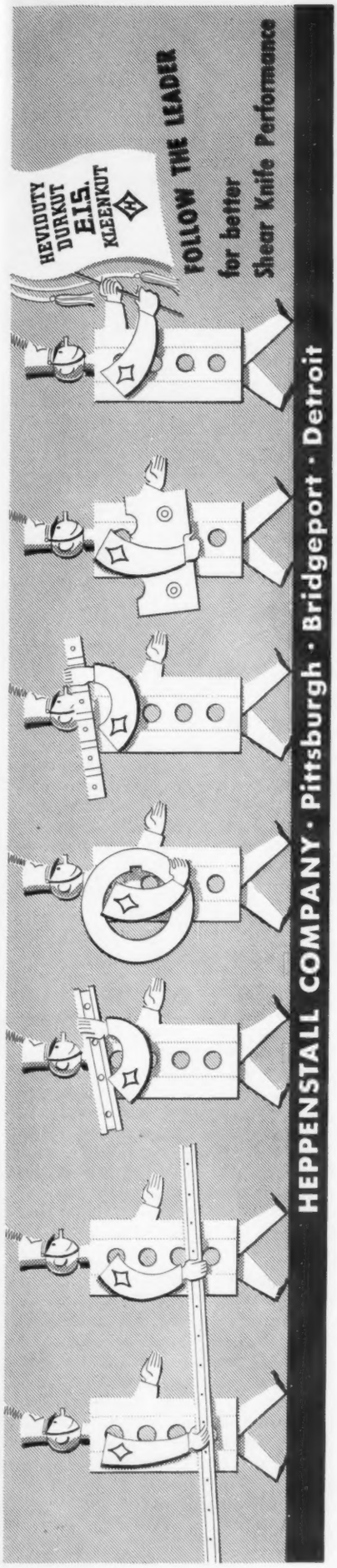
Seattle—Local wholesalers have adopted a new price schedule, effective July 1, in an effort to end the confusion existing in the state during the last three months. While the new prices effect a number of increases, it does not equal prices which went to pieces earlier in the year.

Mid-summer quiet is apparent but several public works jobs will place fair-sized orders soon while increase in general construction is reacting favorably on the jobbing trade.

Nonferrous Metals

New York — Purchase of 21,000 tons of copper in the foreign market by the French government on June 30 and the report that an additional 25,000 tons may be bought soon, was the signal fo the start of a heavy buying wave which carried total domestic sales for the week ended July 8 to a total exceeding that for any full month since July of last year. Electrolytic copper advanced ¼-cent while allied product prices rose proportionately. Lead and zinc appeared firm to strong while only tin displayed easiness in a quiet market.

Copper—All leading sellers advanced prices to the basis of 10.25c, Connecticut, on Friday. This rise followed Tuesday. Specifications are fairly steady, with shipments slightly above production. However, stocks still are fairly heavy.



lowed an advance in the export copper price to 10.30c to 10.35c, c.i.f. European base ports and a steady gain in domestic sales fom 5700 tons on Monday to 19,078 Wednesday and 36,051 Thursday. Producers first raised prices to 10.12½c but available supplies at that level were not sufficient to satisfy the heavy demand.

Tin—Straits spot tin eased steadily during the week, closing at 48.60c, due to light inquiry. The London and Eastern markets were steady.

Lead—Undertone of the market remained strong due to continued active buying and maintenance of a price level in London of over £14 15s. Domestic prices held unchanged, however, at 4.70c, East St. Louis.

Zinc—Since some observers expect a price advance here if the London markets rises to £14 10s to £14 15s, sentiment was bullish. Zinc spot closed at £14 3s 9d on Friday. The domestic market was active at 4.50c, East St. Louis.

Steel in Europe

Foreign Steel Prices, Page 85

London—(*By Cable*)—Demand for steel continues active in Great Britain and output is sold practically to the end of October. Hematite pig iron sales have revived since the lower price became effective July 1. One Scottish grade of foundry iron has been reduced 5 shillings. Steelworks and rolling mills are fully active, especially on ship material, constructional steel, sheets and galvanized sheets. The scrap position continues difficult. Tin plate trade is fair.

The Continent reports activity in semifinished steel, especially exports to Great Britain. The general steel export trade is quieter but satisfactory.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 83

Bolt, nut and rivet business during June was little changed from May, increased jobber buying largely offsetting reduced demand from the automotive and farm equipment industries. Railroad requirements, only moderately active lately, give little indication of early revival in any marked degree. Eastern bolt and nut makers are operating at 35 per cent. Prices are firmer.

Iron Ore

Iron Ore Prices, Page 86

Cleveland—Shipments of iron ore from upper lake ports during June

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OF THE QUALITY AND PERFORMANCE OF THESE SUPERIOR PRODUCTS

On any basis — strength, accuracy, uniformity — these Parker-Kalon *Cold-Forged* Products pass every test with flying colors.

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THUMB SCREWS

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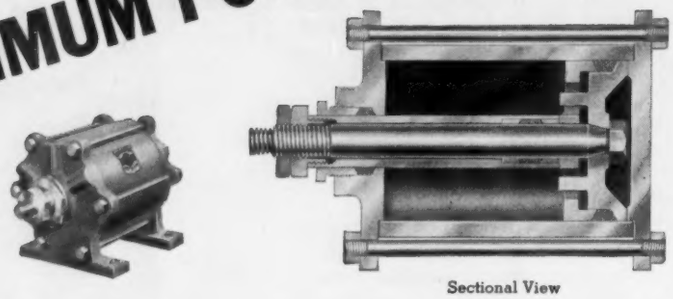
MAXIMUM POWER!



Sectional View

Hannifin Air Cylinders (in all sizes and lengths of stroke) are bored and honed, giving a cylinder bore that is straight, round, perfectly smooth. Simple outside adjustment of the soft, graphite treated piston packing allows easy maintenance of perfect piston seal. Leakage is prevented and friction loss kept at the minimum.

For high efficiency use of air power, investigate Hannifin Air Cylinder advantages. Write for Bulletin 34-S with complete specifications.

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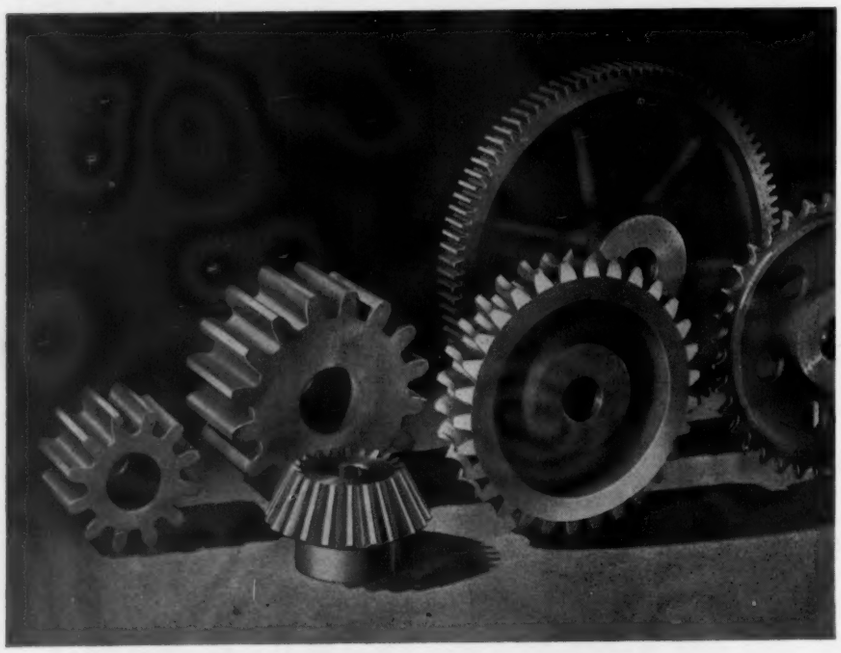
ENGINEERS • DESIGNERS • MANUFACTURERS
Pneumatic and Hydraulic Production Tool Equipment

HANNIFIN "Leak-Proof" AIR CYLINDERS



From the smallest up to 72"—GRANT GEARS. Fast and precise service from our constantly maintained stock, or your special design.

GRANT GEAR WORKS BOSTON

amounted to 5,572,998 tons. This compares with 3,601,453 tons brought down in May and represents an increase of 96.4 per cent over the 2,735,253 tons shipped in June, 1938. Shipments for the season to July 1 in 1939 and 1938, as tabulated by the Lake Superior Iron Ore association, follow:

Port	To July 1, 1939	To July 1, 1938
Escanaba	474,937	160,566
Marquette	854,901	178,062
Ashland	983,003	418,070
Superior	2,817,596	1,641,804
Duluth	1,964,484	916,675
Two Harbors	2,136,328	963,785
Total	9,231,249	4,278,962

Equipment

Cleveland—Machine tool dealers are optimistic over prospects for the summer's business. Orders during the first week in July continued the upward trend and generally were higher than the comparable period in June, considering the holiday interruption. June business in turn is said to have been better than in May.

Inquiries are diversified and mostly for one or two machines at a time. Aircraft industry continues the most active in comparison with its former showing. Automotive interests have made some substantial purchases in this district and miscellaneous industries are fairly active.

Chicago — Machinery buying has made a good start for July, considerable activity having been noted last week, with little effect from the holiday. One large interest states it has already caught up with the time lost over the Fourth. Movement is broad, equipment going to a wide range of miscellaneous interests. Railroad buying lags, and one road has postponed closing on its list until fall. Inquiries are being received in good volume, though average needs are small. Substantial maintenance of last week's business would place this month easily ahead of last, according to sellers.

Seattle—Some sections of the market show symptoms of seasonal recession but electrical equipment and road machinery are still moving freely. Bonneville authority, Portland, has awarded three oil circuit breakers to Pacific Electric Mfg. Co., San Francisco, at $59,734 and four to General Electric at $270,740. Contracts for switches, transformers, circuit breakers and other items have been placed with Westinghouse, Niagara Electric Co., Buffalo, and Standard Transformer Co., Warren, O.

Here's why

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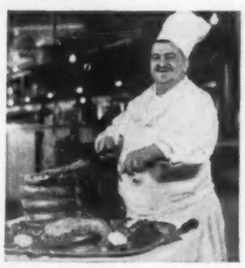
★

A genuine interest in your comfort by everyone from manager to doorman.

Food that has made our four restaurants famous.



Deep beds, crisp linen, modern furnishings planned for comfort.

Gay music for dancing, or calm quiet if you prefer.

Convenience that saves time and money. Hotel Cleveland adjoins the Union Terminal and Terminal Garage, and is next door to everything you'll want to see in Cleveland.

HOTEL CLEVELAND Cleveland

CONSTRUCTION and ENTERPRISE

New York

SARATOGA SPRINGS, N. Y.—Saratoga Vichy Springs Co. plans to construct a new two-story, 72 x 95-foot bottling plant costing an estimated $40,000. King & King, Syracuse, architects.

TARRYTOWN, N. Y.—Board of trustees proposes to build at cost of about $100,000 a sewage treatment plant to serve both this village and North Tarrytown, N. Y.

YONKERS, N. Y.—Board of aldermen proposes to install at cost of $9000 a complete air conditioning system in city's bacteriological laboratory.

Massachusetts

BOURNE, MASS.—Bourne water district, S. A. Days, chairman, plans to construct a steel water tank and tower and watermains at estimated cost of about $200,000. Whitman & Howard, Boston, consulting engineers.

New Jersey

JAMESBURG, N. J.—Town plans to build a sewage treatment plant. WPA project. J. H. Weitzen, New Brunswick, N. J., consulting engineer in work.

JERSEY CITY, N. J.—Continental Can Co., New York, has awarded contract to Austin Co., Cleveland, for a five-story plant costing approximately $850,000.

Ohio

BRYAN, O. — Village, C. F. Hester, clerk, takes bids until noon, Aug. 16, on a 3000-horsepower diesel oil engine and accessories for its municipal power plant. Cost estimated at $150,000. (Noted June 19.)

GRANVILLE, O.—Village, J. D. Stressinger, chairman of board, has completed plans and will take bids immediately on projected improvements to its water softening plant. Hoover & Montgomery, Columbus, O., consulting engineers. (Noted June 26.)

MIDDLETOWN, O.—City, Walter J. Braun, manager, is studying plans for constructing a sewage disposal plant costing $500,000, intercepting sewers, about $1,000,000, other sewers from $700,000 to $800,000. May apply for PWA aid and submit to voters in November a proposal to issue bonds. L. P. Diefenbach, city engineer.

NEW CONCORD, O.—Guernsey-Muskingum Electric Co-operative Inc., Paul Fleagal, president, has received an REA allotment and will probably soon take bids on construction of 166 additional miles of rural electric power transmission lines in six counties at cost of $170,000.

Indiana

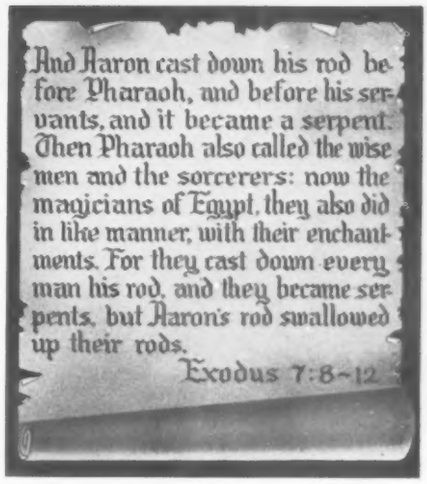
LOGANSPORT, IND.—Board of public works, E. M. Hoyt, clerk, proposes to improve its power plant with new pumps, piping, etc., at cost of about $50,000. C. Ammerman, Indianapolis, consulting engineer.

Kentucky

MAYSVILLE, KY.—Union Oil Co., W. H. Newell, representative, proposes to build a complete plant for bulk storage of petroleum products.

Alabama

CUBA, ALA.—City has plans underway


And Aaron cast down his rod before Pharaoh, and before his servants, and it became a serpent. Then Pharaoh also called the wise men and the sorcerers: now the magicians of Egypt, they also did in like manner, with their enchantments. For they cast down every man his rod, and they became serpents, but Aaron's rod swallowed up their rods.
Exodus 7:8-12

●

While there is no direct connection between the Scriptures and welding, we will take the above as our text for

Eureka

TOOL STEEL WELDING WIRES

The magicians of Egypt and Aaron possessed remarkable rods, but when it came to a test, Aaron's rod showed up the others. Frankly, our tool steel welding wires are not greatly superior to those of other makes. The Egyptian wise men's rods were as good as Aaron's, but in the long run, Aaron's gave more satisfaction. That is what EUREKA welding rods do: they give more eventual satisfaction. When we say that EUREKA TOOL STEEL WELDING WIRES for electric arc, atomic and oxy-acetylene welding combine the ultimate in cutting and wearing qualities, we expect you to reserve opinion until you prove these statements by using our products.

Do you have a welding or cutting problem? Let us hear about it.

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WELDING EQUIPMENT & SUPPLY CO.
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DETROIT, MICH.

ADVERTISING PAGES REMOVED

for a waterworks to cost $25,000 with equipment. J. W. Goodwin Engineering Co., Birmingham, Ala., consulting engineer.

Maryland

BALTIMORE—Consolidated Gas, Electric Light & Power Co. has completed plans for a new substation, is building preliminary structure at cost of $21,000.

Georgia

LINCOLNTON, GA.—City is receiving bids for improvements to its waterworks at cost of about $30,000. J. B. McCreary Co., Atlanta, Ga., consultants.

Louisiana

HOMER, LA.—Homer Louisiana Electric association, Willie Rainarch, representative, proposes to soon start construction of 231 miles of rural electric lines in two parishes at estimated cost of $175,000.

Missouri

ST. LOUIS—Wackman Welded Ware Co. plans to build a one-story, 100 x 600-foot plant at Lake Charles for manufacturing steel drums and barrels. Will build power house. Total cost estimated at $100,000.

ST. LOUIS—Monsanto Chemical Co. has awarded a contract to Fruin-Colnon Contracting Co., 403 Olive street, for a one-story, 60 x 135-foot machine shop costing approximately $50,000.

Oklahoma

EUFAULA, OKLA.—City plans to install diesel engine generating equipment in its water works pumping plant at cost of about $30,000. R. Collins, Eufaula, engineer.

Minnesota

CEDAR, MINN.—Rural Electric cooperative, Harry Edmunds, clerk, has been allotted $500,000 by REA for a generating plant.

CLEMENTS, MINN.—Central Minnesota Power co-operative, Edward Turner, superintendent, has been allotted $151,000 by REA to aid in construction of about 150 miles of rural electric lines in four counties.

GLENCOE, MINN.—REA has allotted $182,000 to the McLeod Co-operative Power association, A. W. Ohland, superintendent, to finance about 177 miles of rural transmission lines in four counties.

MOOSE LAKE, MINN.—Village, Norman Swanson, clerk, takes bids to 8 p.m., July 17, on furnishing and installing digestor mechanisms for its sewage disposal plant. Charles Handschu, Moose Lake, Minn., consulting engineer.

ST. PAUL—State highway department, M. J. Hoffman, commissioner, takes bids to 11 a.m., July 17, on power and light distribution panels, and service cabinet with light and power switches, for central shop at fair grounds. Certified check 5 per cent to accompany bid.

STAPLES, MINN.—City, B. C. Barrett, clerk, is receiving bids to 3 p.m., July 14, on a deep well turbine pump. Certified check 10 per cent to accompany bid. P. C. Bettenburg, St. Paul, engineer.

Texas

GILMER, TEX.—Upshur Rural Electric Co-operative Corp., B. E. Latch, president, receives bids for 150 miles rural electric power transmission lines in nine counties. C. C. Hudspeth, Gilmer, engineer.

HAMLIN, TEX.—City, J. L. Culberson, mayor, receives bids July 11 on contract 4 in construction of a complete water filtration plant. French & Pruitt Co., Abilene, Tex., consulting engineer.

Iowa

ATLANTIC, IOWA—City, F. W. Herbert, clerk, is studying proposal for a sewage disposal plant.

CEDAR FALLS, IOWA—City has completed plans for a sewage disposal plant to cost $100,000. Clark N. Streeter, city engineer.

McGREGOR, IOWA—City has plans for a municipal light plant. Young & Stanley, Muscatine, Iowa, consulting engineers.

WATERLOO, IOWA—John Deere Tractor Co. has awarded a contract to Jean Olesen & Sons Construction Co., Waterloo, for a three-story, 100 x 140-foot factory costing $70,000.

WATERLOO, IOWA—Soy Bean Processing Co., C. E. Butler, president, is taking estimates on a power plant to cost about $20,000. Helmick, Edeskuty & Lutz, Minneapolis, consulting engineers.

Colorado

DENVER—Bureau of reclamation takes bids to July 15 on outdoor-type transformers, oil circuit breakers, disconnecting switches and lightning arrester for Elephant Butte power plant at Rio Grande project.

Wyoming

LYMAN, WYO.—Bridger Valley Electric association, Van A. Rupe, president, has been allotted a $108,000 REA loan for a projected generating plant and 52 miles of rural electric power lines.

Montana

HYSHAM, MONT.—REA has allotted $133,000 to the Mid-Yellowstone Rural Electric association, T. J. Cunningham, president, to finance 70 miles rural electric power transmission lines in two counties.

Pacific Coast

COLMA, CALIF.—Halfmoon Bay Drum & Box Co. plans to rebuild its mill and boiler plant damaged recently by fire with a loss of $150,000.

CUPERTINO, CALIF. — Permanente Corp., H. J. Kaiser, president, Oakland, Calif., asks bids until July 25 on a cement plant costing over $100,000. (Noted May 22.)

EL CENTRO, CALIF.—Imperial irrigation district asks bids until July 18 for a hydroelectric plant costing over $40,000 at drop No. 4 on the All-American canal. M. J. Dowd, Imperial, Calif., engineer.

LOS ANGELES — Schumacher Wall Board Corp., A. R. Moylan, general manager, will begin construction this summer of the first unit of a factory costing approximately $1,500,000 with equipment.

LOS ANGELES—American Can Co. is ready to begin construction of its proposed factory and warehouse, 217 x 245 feet, to cost about $125,000.

LYNWOOD, CALIF.—Grayson Heat Control Co. Ltd. will immediately begin construction of a factory building to cost approximately $13,000. Equipment will be installed.

Canada

WESTVIEW, B. C.—City proposes to build a waterworks costing $40,000. Light, power and water board in charge.

ST. BONIFACE, MAN.—Liquid Carbonic Corp. Ltd. plans to erect an extension to its plant at cost of $50,000.

COTE ST. LUKE, QUE.—Canadian Industries Ltd., 1135 Beaver Hall square, Montreal, plans to build a four-story manufacturing plant, power house and warehouse costing a total of $100,000. L. de B. McCrary, Montreal, consulting engineer.

MONT LAURIER, QUE.—Flacage de Bellevive Ltee. proposes to construct a manufacturing plant estimated to cost $40,000.

Hollow Bored Forgings and Steel Shafting

LATHE SPINDLES
HYDRAULIC CYLINDERS
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1054 W. 20th STREET ERIE, PENNA.

READER Comments

Readers are invited to comment upon articles, editorials, reports, prices or other editorial material appearing in STEEL. The editors cannot publish unsigned communications, but at their discretion may permit a writer to use a pseudonym when a bona fide reason exists for withholding his identity. Letters should be brief—preferably not exceeding 250 words.

Fair Price Is Favored

To the Editor:

In relation to the situation in which steel finds itself at the present time, I can endorse 100 per cent the statement of E. T. Weir. (STEEL, June 26, p. 17.)

In general, we cannot but feel that buyers are willing to pay a fair price for materials of all kinds which insure to the seller a reasonable profit such as they expect in their own business; but when any individual or small group in an industry breaks prices down, through pressure brought to bear in any way, so that they do not give a return to the seller, we can see no hope of more prosperous conditions, nor can it be considered as an invitation for capital investment.

W. T. READ

President and treasurer,
Morse Twist Drill & Machine Co.,
New Bedford, Mass.

Plan for Steel Cost Figures

To the Editor:

I have read with interest Mr. Kulas' article "Industry's Lack of Accurate Cost Figures Causing Heavy Loss," in the June 26 issue of STEEL.

All executives agree that all overheads must be analyzed, but will an analysis of the overhead be of any help, if the basis for building up the overhead is not sound?

The steel industry, with competition as it exists, finds that a good practical cost system is in big demand. There are cost systems built up on unsupported or ill-supported theory, a guess, or conjecture, and not on facts that could be secured if practical men with considerable service were given an opportunity to have their ideas put into practice.

The steel industry's selling price unit is generally known to be weight, and therefore the costs are set up on the same basis. The main items of cost to be kept under control are all items of manufacturing costs—raw material, direct labor, and manufacturing overhead —general administrative and selling expense, taxes, and depreciation.

With the steel business as competitive as it is today the cost should be built up, using the selling price as base; that is, take the selling price, and from it deduct a reasonable profit, and then build up a cost to this unit figure. The question could be asked, how would this be done?

To attain a profitable cost, every piece of equipment should be charted, showing productive 100 per cent efficiency for each production item, so all variables in the kind of production processed on the equipment would be taken into consideration. After all 100 per cent production efficiency charts have been completed, then check actual productions against the chart, to learn whether the rates established are in line with productions that must be secured for a reasonable return on the investment, from the standpoint of profits.

Direct labor rates should be set up on the basis of ton hour. Indirect labor, repairs and maintenance, tools, lubricants and miscellaneous supplies and all other processing cost items should be budgeted on the basis of unit of production hours, in the case with most, if not all, steel companies, on basis of ton-hours. Ton-hours are arrived at by multiplying the productive tonnage by the productive labor hours. The only way to attain the desired result from this budget would be to have a flexible rate schedule for all indirect labor, and general administrative and selling expense.

These items of cost could be held in a profitable relationship with direct labor costs and in harmony with total production capacity, as warranted by business demands. The use of this idea would set up indirect labor and other overhead costs that would take into consideration all variables in the products.

Efficiency Reduces Taxes

The cost of real estate taxes and taxes on equipment can be controlled by making a study, to learn whether a proper production efficiency per 1000 feet of productive area, is attained. Production efficiency charts would prove to be a great help for this control. Proper production control will keep taxes on inventories at a low minimum.

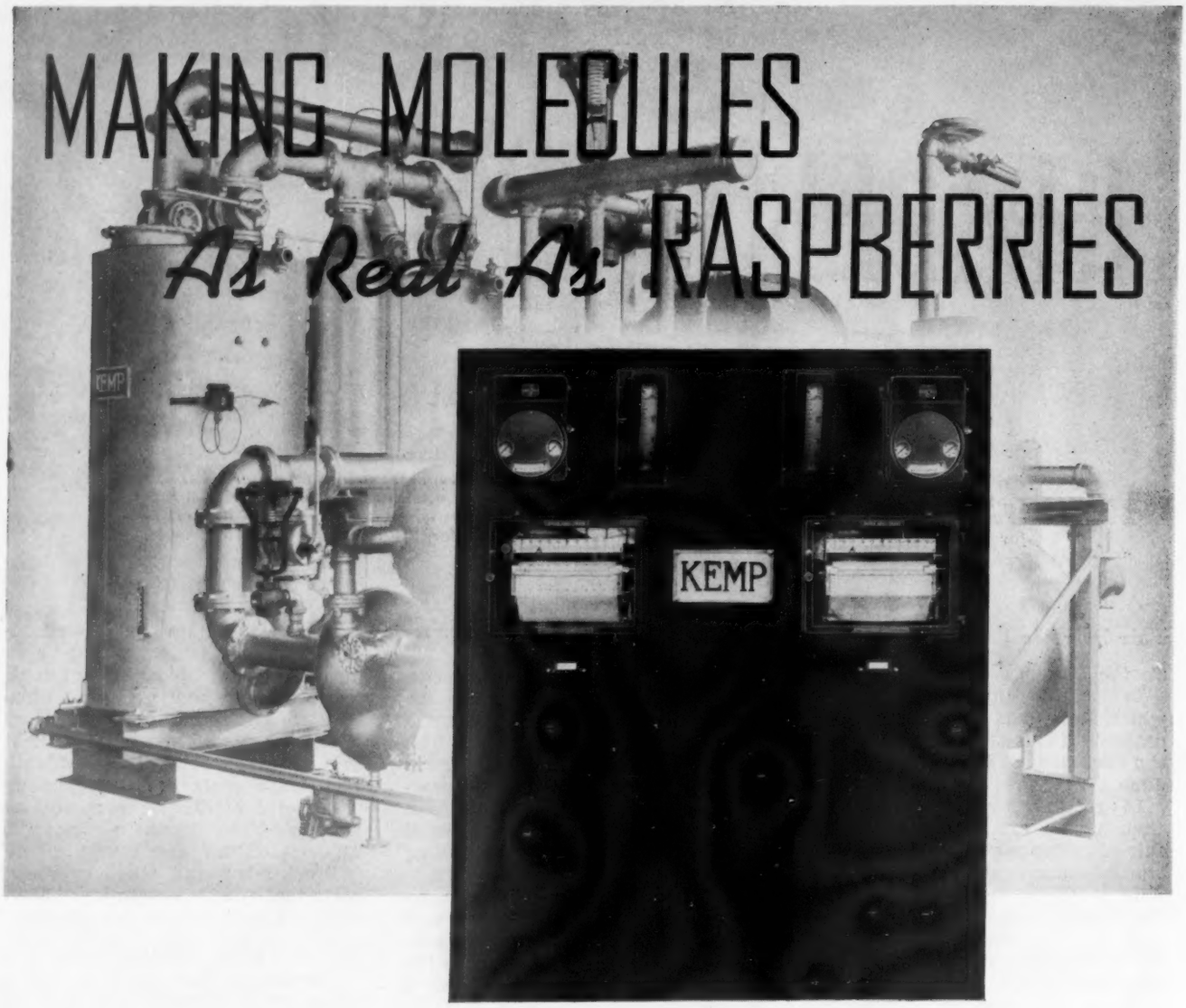
The cost of depreciation could also be controlled through efficiency charts, possibly showing the need of better supervision to keep the flow of process material up to a point where all avoidable delays, that would interfere with production efficiency, would be kept down to almost nothing. The production control, scheduling, and planning departments would also play a prominent part to keep delays down.

This cost setup would bring out the necessity of sound merchandising methods, sound quoting of sales prices, and a flexible rate structure that would carry along with productive hours.

W. H. HEMANN SR.

Cost Analyst,
1315 Edward street,
Lakewood, O.

MAKING MOLECULES *As Real As* RASPBERRIES



Molecules are no mystery to the Kemp Constant Analysis Monitor. The twin installation shown above provides a sensitive, practically instantaneous electrical nervous system for a pair of Kemp 15,000 c. f. h. Atmos-Gas Producers in one of the largest and most modern sheet mills in the world.

Atmos-Gas that goes to these annealing furnaces is *right* and *stays right*, for by means of its constant sampling and constant analysis of the product gas, the C. A. Monitor automatically compensates for the uncontrollable variables the instant they effect the composition of the Atmos-Gas.

The C. A. Monitor operates Kemp Atmos-Gas Producers (and any other controllable atmosphere generator) of all capacities from 1,000 to 15,000 c. f. h.

Special, detailed bulletins on the C. A. Monitor and Atmos-Gas Equipment are now available. Address The **C. M. Kemp Mfg. Co., 405 East Oliver St., Baltimore, Md.**

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